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(Östasiatiska Museet)
STOCKHOLM



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Stockholm 2003

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The intriguing prehistoric human figure which decorates the cover of the *Bulletin of the Museum of Far Eastern Antiquities* since its inaugural issue in 1929, is one of the most famous items in the Museum's collections (no. K11038: 5, displayed anew from Sept. 2004 in the permanent exhibit "China Before China"). Collected from the Banshan area, Gansu, China, it is fashioned as the painted lid of a ceramic vessel, with tattoo-like facial patterns, truncated "horns" that may have held a shaman's plumes, and on its back a serpent "which covers the neck in graceful coils" (Johan Gunnar Andersson's original description in his "Researches into the Prehistory of the Chinese", *BMFEA* 15, 1943, 240; pl. 187). It may have been modelled on calabash containers (see Karl G. Izikowitz, "Calabashes with star-shaped lids in South America and China," *Comparative Ethnographical Studies* 9, Gothenburg Ethnographical Museum, 1931, 130-34).

The dragon on the title page, the traditional logo of the Museum, is one of three dragons on the back of a bronze mirror of the Warring States period of ancient China, and is also in the MFEA collection (K10599: 550; see Bernhard Karlgren, "Early Chinese Mirrors," *BMFEA* 40, 1968, 85-86, plate 35).

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Editor's Introduction

by

Magnus Fiskesjö

Some eighty years ago, after his pathbreaking discoveries of an unknown prehistory in what today is China, Johan Gunnar Andersson suggested the next step should be to examine actual archaeological evidence to address the long-standing questions regarding prehistoric cultural contacts across Eurasia.

In particular, Andersson, the founder of the Museum of Far Eastern Antiquities, was concerned with explaining the striking similarities between the already known painted ceramics from prehistoric sites such as Tripolje in Southern Russia and Anau in Turkmenistan, and the prehistoric painted Yangshao ceramics first unearthed by him in 1921 along the middle reaches of the Yellow River in China, which became the foundation of the MFEA collections.¹

Was this a case of what biologists nowadays call “convergent evolution,” or had there been direct contacts and influence between the people who created these objects, or were both alternatives true, and the picture really much more complex, as Andersson later was to suggest? And if so, how should we understand the long-distance or indirect influence that people of ancient times exerted on one another?

Andersson did not have the chance to assemble much data to go on, before twentieth-century history intervened and for a long time put a full stop to this research. However, even so, as the Chinese archaeologist Tong Enzheng has underlined, Andersson nevertheless clearly opposed the European “superiority bias” of his own time which took Western influence on ancient Asia as the default truth, on account of which it was even suggested that civilization could not possibly have been autochthonous in East Asia but simply must have been brought there by some ancient Western “Herrenvolk,” – and we note that these were ideas certainly in vogue in 1943, when Andersson published his main report on Yangshao archaeology.²

¹ See, in particular pp. 46–47 and 55 ff. of the recent book *China Before China: Johan Gunnar Andersson, Ding Wenjiang, and the Discovery of China's Prehistory* (Museum of Far Eastern Antiquities monograph no. 15. Stockholm: MFEA, 2004). This bilingual English–Chinese volume, coauthored by Magnus Fiskesjö and Chen Xingcan, includes extensive discussions of Andersson's ideas, his discoveries, and their historical and intellectual context. It builds on new research in archival materials, and has an extensive bibliography that should prove useful for further research.

² See Tong Enzheng, “Thirty years of Chinese archaeology, 1949–79,” in *Nationalism, Politics, and the Practice of Archaeology*, ed. Philip L. Kohl and Clare Fawcett; Cambridge, England: Cambridge University Press, 1996, 177–97 (citing Andersson, “Researches into the prehistory of the Chinese,” *BMFEA* 15, 1943, 291; a volume itself also often cited throughout this issue of the *BMFEA*).

Only from the 1990s onwards has it once again become possible to explore these issues across modern borders in new research producing new evidence, and certainly reawakening what was perhaps a naive, but nevertheless without doubt partially correct appreciation of the long-distance, even cross-continental travel and interaction that people have proved themselves capable of, even in ancient times, and even while constructing independent cultural traditions of their own.³

The special theme of this volume of the *Bulletin of the Museum of Far Eastern Antiquities*, entitled "New Perspectives in Eurasian Archaeology," is the question once raised by Johan Gunnar Andersson regarding ancient East-West contacts across Eurasia. The set of papers that appears here sheds new light on these Eurasian questions. They are mostly papers originally presented at a symposium held in Stockholm on November 21–23, 2003, plus additional invited articles from scholars who did not attend the symposium: Bo Lawergren's paper on "Western Influences on the Early Chinese *Qin-Zither*," and Louisa G. Fitzgerald-Huber paper "The Qijia Culture: Paths East and West," which recalls both her previous contribution to the study of the Andersson collections ("The Traditions of Chinese Neolithic Pottery," in *BMFEA* 53, 1981), as well as another former student of these materials, Margit Bylin-Althin (*BMFEA* 18, 1946) whose insights were also mentioned in the recent Swedish-language catalogue of these prehistoric ceramics written by Dr. Eva Myrdal and published by the museum in 2004.⁴

It is also fitting that the one additional contribution to this volume not immediately connected with its theme, the article by Lucie Olivová of Palacky University in the Czech Republic on "Forgotten Bridges," concerns bridges – our favorite symbol of intercultural contact (perhaps second only to inflatable rafts).

The symposium itself, "New Perspectives in Eurasian Archaeology – Johan Gunnar Andersson Commemorative Symposium on the Making of China in the Context of Prehistoric East-West Eurasian Contacts," was held as part of the Annual Asia-Europe Workshop Series sponsored by the Asia-Europe Foundation, ASEF, and the International Institute for Asian Studies, IIAS, in Leiden, the Netherlands. The arrangements of the symposium, organized by the Museum of Far Eastern Antiquities in collaboration with the Institute of Archaeology of the Chinese Academy of Social Sciences in Beijing, were generously supported by ASEF and the IIAS.

I wish to reiterate our gratitude to the sponsors and to all who helped make it a success: Professor Liu Qingzhu, Director-General of the Institute of Archaeology of the Chinese Academy of Social Sciences in Beijing, and Dr. Nils Ringstedt, chair

³ As mentioned at the 2003 symposium, a striking example of this is the Helgö Buddha, a small figurine now on display at the National Museum of Antiquities (Historiska Museet) in Stockholm. It is an object once produced in northwestern India, somehow relayed to Scandinavia with a leather string around its neck, and then re-discovered in 1955 in the pre-Viking, ca. 8th century AD layers of an archaeological site on the island of Helgö, near Stockholm (see the posthumous paper by the late Bo Gyllensvärd [1916–2004], "The Buddha found at Helgö," in *Excavations at Helgö*, Vol. 16: *Exotic and sacral finds from Helgö*, Stockholm: Kungl. Vitterhets Historie och Antikvitetsakademien (Royal Academy of arts and letters), 2004, 11–27). See too Nils Ringstedt's related comments, this volume.

⁴ Eva Myrdal, *Kina Före Kina* (Stockholm: MFEA, 2004).

or the Swedish Archaeological Society (whose members recently, in October 2004, visited their Chinese colleagues and with the aid of the Institute of Archaeology made a return trip to Yangshao Village, the first by Swedish archaeologists since Andersson), as well as our sister Museum of Mediterranean and Near Eastern Antiquities which opened its doors to house part of the symposium away from the clouds of construction dust at the MFEA, and last but not least Johan Klange, Caroline Ribers, Kerstin Bergström, and many other industrious staff members at the Museum of Far Eastern Antiquities. (The photo, below, shows one lively moment at the symposium).

The symposium papers and presentations included here are by Li Shuicheng, Peking University; Mei Jianjun, then at the Needham Institute in Cambridge, England, and today of the University of Science & Technology in Beijing; Yuan Jing, the Institute of Archaeology of the Chinese Academy of Social Sciences, and his co-author Rowan Flad of Harvard University; Choe Chong Pil of Sejong University, Seoul; Chen Xingcan, Institute of Archaeology, CASS, Beijing; Donald B. Wagner of the Nordic Institute of Asian Studies in Copenhagen, and last but not least, Nguyen Kim Dung of the Institute of Archaeology, Hanoi, on Johan Gunnar Andersson's research in Vietnam in the late 1930s once reported by him as volume 11 (1939) of the *BMFEA*. Dr. Nils Ringstedt's introductory remarks on "Swedish Archaeology and the Archaeology of Long-Distance Trade" here concludes the section deriving from the symposium.

Several presentations made at the symposium are regrettably not included in this volume in paper form, but we eagerly look forward to see them published elsewhere. These presentations are listed here for reference: Evgeny Bogdanov, archaeologist, together with Igor Slusarenko, a specialist in dendrochronology, both of the Institute of Archaeology and Ethnography, Russian Academy of Sciences, Siberian Branch, Novosibirsk, offered a joint report on recent research in Siberian archaeology; (here, Evgeny Bogdanov instead contributes a brief related article concerned with influences in ancient art; Miyamoto Kazuo of Kyushu University, on "Chinese Civilization and Barbarians: Interrelationship through Prehistoric East-West Eurasian Contacts;" Okamura Hidenori of Kyoto University, on "The Expansion of Pastoralism and the Formation of Early States in China;" Chen Xingcan, IA, CASS, Beijing, and Elisabeth Iregren, Lund University, Sweden, jointly presented recent research on human skeletal materials recovered from Gansu by Johan Gunnar Andersson in the 1920s; Zhang Chi of Beijing University spoke on "Early Pottery in China in Regional Context," reviewing recent discoveries of early pottery; Bettina Zorn of the Museum of Ethnology, Vienna, on "The *Sandai* (Three Dynasties) and the Politics of Archaeology in the PRC;" Magnus Fiskesjö, MFEA, on "What Motivated China-Gunnar? Towards an Intellectual Biography of Johan Gunnar Andersson;" Håkan Wahlquist, curator at the Museum of Ethnography in Stockholm and secretary-general of the Sven Hedin Foundation, on "The Archaeology of the Sino-Swedish Expedition 1927–35 and the Legacy of Johan Gunnar Andersson," with reflections not least on the work of Andersson's colleague in Chinese and Central Asian archaeology, Folke Bergman.

EDITOR'S INTRODUCTION

Finally, the editors of the *BMFEA* wishes to extend a special thank you to the editorial advisory board, and especially also to Gideon Shelach, Hebrew University in Jerusalem, Israel; Chen Xingcan, Institute of Archaeology of the Chinese Academy of Social Sciences, Beijing; and Kazim Abdullaev of the Institute of Archaeology in Samarkand, Uzbekistan, for their generous assistance in our work for this volume.



The participants in the symposium "New Perspectives in Eurasian Archaeology – Johan Gunnar Andersson Commemorative Symposium on the Making of China in the Context of Prehistoric East-West Eurasian Contacts," gathering for festivities at the MFEA on November 22, 2003.

Ancient Interactions in Eurasia and Northwest China: Revisiting J. G. Andersson's legacy¹

by

Li Shuicheng

Johan Gunnar Andersson, the Swedish geologist and archaeologist, worked during 1914–1924 as a consultant to the Department of Agriculture and Commerce, China. During this period, he at first devoted himself to research on Cenozoic geology and paleontology, and his interests then gradually turned to archaeology. Andersson surveyed the Zhoukoudian site, and became the pioneer of Peking Man research. He discovered the Neolithic Yangshao 仰韶 culture at Yangshao Village, Henan Province, and discovered and excavated many sites ranging from the Neolithic period to the Bronze Age in the present-day provinces of Gansu 甘肅 and Qinghai 青海.

Andersson divided the above Neolithic discoveries into six phases: Qijia 齊家, Yangshao (Banshan 半山), Machang 馬廠, Xindian 辛店, Siwa 寺窪 (Kayue 卡約) and Shajing 沙井, and hypothesized their absolute dates. Andersson was one of the earliest scholars to study Chinese Neolithic cultures. Due to the limitations of methodologies and archaeological materials, he misdated some Chinese prehistoric cultures and argued for the possibility that Chinese culture had originated from the West. However, he still made fundamental contributions to the development of Chinese archaeology. Later, he corrected his viewpoint that Chinese culture originated from the West and emphasized that “China” – whether defined in terms of ethnicity or material culture, had developed continuously from the Yangshao through the Shang period, and to the present day.

In 1921, Dr. Andersson excavated the Yangshao site, in Henan Province, together with Yuan Fuli and other scholars. This historical event has been considered as the symbol of the birth of modern Chinese field archaeology. Before this excavation, Andersson had also played an important role in the discovery of Peking Man. Thereafter, in order to trace the origin of Chinese civilization, he traveled to northwestern China repeatedly as part of a long-term research project through which he recon-

¹ This article commemorates the 80th anniversary of the conclusion of Andersson's archaeological fieldwork in Northwestern China. The research topic is an item covered by the People's Republic of China, Ministry of Education, Humanities and Social Science Research of the Tenth Five-Year Plan and has been supported as such (item No. 01JA780002).

structed the local prehistoric cultural sequences in preliminary way.² The above events give Andersson a special position in the history of Chinese archaeology.

During the early 20th century, a number of Chinese and foreign scholars started to focus on the issue of the origin of Chinese culture. The discovery of Yangshao culture brought this issue to the forefront of academic research. At the outset, Johan Gunnar Andersson, the prominent Swedish geologist and archaeologist, believed that Yangshao culture was a primary fountain of Chinese civilization, and accordingly entitled his first book on Yangshao "An Early Chinese Culture."³ Later, due to the influence of certain western scholars, he accepted the view that the Yangshao culture had originated from the West, and it was based on this hypothesis that he traveled to northwestern China, to find proof.⁴

During the period 1949–1970, Andersson was often criticized by Chinese scholars because he advocated the "Western origin theory." It did not matter, then, that he had already recognized in 1943 that there were problems with this theory and furthermore also admitted certain errors in his early publications.⁵ However, with the coming of Cold War, the political atmosphere permeating the scholarly world led to a critique from contemporary Chinese scholars that went beyond purely academic discussions. Only starting in the 1980s did Andersson's research begin to receive more objective evaluation from Chinese academics⁶. This history reflects fluctuations that have occurred in Chinese archaeology.

One might say that the "Theory of Western origin of Chinese culture" arose against a background of "Eurocentrism." In the beginning, this theory was supported by many foreign scholars and also by some Chinese scholars, although most Chinese scholars were rather more skeptical. However, with the limited archaeological materials that were available in the early 20th Century, no one could clearly explain the origin of the Chinese civilization. Tracing the origin of Chinese civilization, therefore, became the major mission of Chinese archaeology. It was under these circumstances that excavations such as those at the Yinxu 殷墟 (the "Yin dynasty ruins") near Anyang 安陽 and Doujitai 鬥雞台 in Baoji 寶雞 were undertaken. From 1950 onward, new discoveries continuously accumulated, and the data gradually eroded the "Theory of Western origin of Chinese culture" and offered increasing amounts of evidence supporting, instead, a "Theory of local origin of Chinese culture".

Although the "Theory of local origin of Chinese culture" has generally replaced the "Theory of Western origin" we still face many unanswered questions. How did Chinese civilization develop? Did it develop purely independent from all external contact? Or, did it have certain contacts with or influences from other regions? If it experienced external contacts, what sorts of influence did other cultures have on Chinese civilization?

² Andersson, J.G., *Children of the Yellow Earth* (London: Kegan Paul, Trench, Trubner & Co., 1934).

³ Andersson, J.G., "An early Chinese culture." *Bulletin of the Geological Survey of China*, 1 (5), 1923.

⁴ Andersson, J.G., "Preliminary report on archaeological research in Kansu." *Memoirs of the Geological Survey of China* (Series A) 5 (1925), 1–51.

⁵ Andersson, J.G., "Researches into the Prehistory of the Chinese." *Bulletin of the Museum of Far Eastern Antiquities* 15 (1943).

⁶ Yan Wenming, "Jinian Yangshaocun yizhi faxian liushiwu zhounian (The 65th anniversary of the discovery of Yangshaocun site)." In Yan Wenming, *Yangshao wenhua yanjiu* (Studies of the Yangshao Culture) (Beijing: Wenwu, 1989), 328–50.

At present, as for the answers to these questions, there is a variety of opinions. This paper seeks to introduce some new data that are directly relevant to the attempts to address these issues. Hopefully this reconsideration will stimulate further developments in this research.

But before we can make this effort, it is necessary to clarify the geographic situation in the parts of modern China where these contacts may have taken place. The landscape of China is generally characterized by high-altitude mountain ranges to the west, and low-altitude plains to the east. The altitude of its topography decreases in several steps from west to east. Three large steps, or 'terraces', may be distinguished. The first terrace is the Qinghai-Tibetan Plateau in west-central China, occupying one-third of the land of present-day China, with a mean altitude of 4000 m. The second terrace includes the Xinjiang Inner Mongolia Plateau, the Loess Plateau, and the Yunnan-Guizhou Plateau, with a mean altitude of 1000–2000 m. The third terrace includes the vast eastern low plains, and hilly country, with a mean altitude of 200–500 m.⁷ [Figure 1]

We may adopt a perspective that defines the Chinese world in relation to the Great Wall, and divides the regions of greater China into two major parts; one facing the sea, and the other facing the grasslands of inner Eurasia [Figure 2]. The former includes most parts of the Yellow River valley, as well as the middle and lower Yangtze River valley. These are the core areas where Chinese culture originated and developed. Since the prehistoric period, Chinese civilization has independently come into being in this core region, in relative isolation from other areas. The latter comprises the vast area outside of the Great Wall. The climate and environment of this region is very different from that of the former area, but the archaeological culture in the parts of this region closest to the former are basically derivative of it and the result of the gradual extension of Yellow River culture outward. It can be said that continuous ties have existed between these two zones, and the region outside the wall is primarily an offshoot of Yellow River civilization. Since the latter area is located between the Yellow River civilization and Central Asia and subsumes within itself transportation routes between these two regions, external influences arriving from the east and west have always been unavoidable. Due to a long era of cultural intercourse, the interaction between this and other areas have been comparatively open and frequent.

The Northwestern region of China, here called "the Northwest," is a vast border area that can already be considered part of greater Central Asia. This region is not only located on the major communication route between the Yellow River civilization and Central Asia. It is also an area exposed to cultural contacts and interactions with various regions. The Northwest is therefore an important zone for the exploration of various aspects of the relationship between the Yellow River civilization and Eurasian mainland. [Figure 3]

Archaeological discoveries in recent decades have basically clarified the evolution in China's Northwest from the Neolithic to the Bronze Age. Around 8,000 B.P., the Laoguantai 老官台 culture emerged in the upper Weishui 渭水 river valley,

⁷ Winker, M.G. & K.W. Pao, "The late-Quaternary vegetation and climate in China." In H.E. Wright et al, eds. *Global Climates Since the Last Glacial Maximum* (Minneapolis: University of Minnesota Press, 1993), 221–61.

along with agriculture, and animal husbandry. Some human groups, associated with microlithic tools, and with hunting and gathering subsistence patterns, continued to sparsely occupy the Guide 貴德 and Chaidamu 柴達木 Basins in Qinghai Province. The environment of these basin areas is far more inhospitable than the Weishui valley; thus populations in this region were smaller. From 7,000 B.P., the early Yangshao culture expanded to the eastern and western sides of the Liupanshan Mountains 六盤山, and by 5,500–5,000 B.P., middle and late Yangshao culture entered into eastern Qinghai, and progressed southward into the Daduhe River 大渡河 gorges in what is today Northwestern Sichuan 四川 Province. After 5,000 B.P., the Majiayao 馬家窯 culture expanded westward into the Jiuquan 酒泉 area corridor, in the area around the Qilianshan 祁連山 Mountains. After 4,000 B.P., painted pottery with a clearly post-Machang style emerged far to the west in Hami 哈密, Xinjiang 新疆. Then, some Siba 四壩 culture inhabitants migrated from the Hexi corridor into eastern Xinjiang [Figure 3]. This trend deeply influenced the later cultures in Xinjiang area.⁸

The above migration of culture was caused by the continuous outward expansion of Yellow River civilization. But we must consider how Central Asian cultures reacted to this trend. Around this time there seems to have been some cultural infiltration from Central Asia into Xinjiang and other nearby areas. This seems to be the first time that these cultural areas came into direct contact. Our ability to reconstruct the details of this contact is extremely limited, but, the emergence of new data allows us to begin to address several questions concerning East-West contact: Did the Central Asian cultures influence the cultures to their east? Did they have crucial contacts with these newly established groups? What was the nature of this contact? What was its scale? We will examine these issues by recourse to some examples:

(1) Archaeological discoveries in northern Xinjiang prove that around two thousand B.C., some Central Asian groups entered northern Xinjiang along the Ertix 額爾齊斯 and Ili 伊犁 River Valleys. Sparsely distributed Andronovo Culture remains have already been discovered along a corridor from the Ili to the Jungar 准葛爾 Basin.⁹ According to the existing evidence, the Andronovo culture by this point had already passed over the Tianshan 天山 Mountains and reached south to Hoxud 和碩 County on the northern edge of Bosten-Bagrax 博斯騰 Lake.¹⁰ Furthermore, it continued to spread southward to the Lop Nur 羅布泊 Region.¹¹ [Figure 4]

⁸ Li Shuicheng 2002b, "Interaction between Northwest China and Central Asia during the Second Millennium B.C.: An Archaeological Perspective," Chapter II in Katie Boyle, Colin Renfrew & Marsha Levine, eds. *Ancient Interactions: East and West in Eurasia*. McDonald Institute Monograph (Cambridge, England: University of Cambridge Press, 2002), 171–80.

⁹ See Xing Kaiding and Liu Ning, "Shihezi shi gumu (The Ancient Tomb in Shihezi)," *Xinjiang wenwu* (Cultural Relics in Xinjiang) 1994.4, 12–19; also Li Xiao and Dang Tong, "Zhunge'er pendi zhoubu dian qu chutu tongqi chutan (A preliminary study of copper and bronze artifacts unearthed from the surrounding regions of the Zhunge'er Basin)," *Xinjiang wenwu* 1995.1, 40–51.

¹⁰ Lü Enguo, "Heshuo xintala yizhi fajue jianbao (Brief report on the excavation of the Xintala site in Heshuo County)," *Kaogu* (Archaeology), 1988.5, 399–407.

¹¹ Xinjiang Wenwu Kaogu Yanjiusuo, "2002 Nian Xiaohu mudi kaogu diaocha yu fajue baogao (Survey and Excavation Report on the Xiaohu cemetery, 2002)," *Xinjiang wenwu* 2003.2, 8–64.

(2) Biological anthropological research indicates that the physical characteristics of those buried in the Gumugou 古墓沟 cemetery along the Kongque River near Lop Nur in Xinjiang are very similar to those of the Andronovo culture and Afanasievo culture people from Siberia in southern Russia. This suggests that all of these individuals belong to the Caucasian physical type.¹² Additionally, excavations in 2002 by Xinjiang archaeologists at the site of the Xiaohe 小河 cemetery, first discovered by the Swedish archaeologist Folke Bergman,¹³ uncovered mummies and wooden human effigies that clearly have Europoid features [Figure 6.1]. According to the preliminary excavation report, the cultural features and chronology of this site are said to be quite similar to those of Gumugou¹⁴. Other sites in eastern Xinjiang. Also contain both individuals with Caucasian features and ones with Mongolian features. For example, this pattern occurs at the Yanbulark 焉不拉克 cemetery in Xinjiang, but individuals with Mongoloid features and clearly dominant¹⁵. The above evidence is enough to show that, starting around 2,000 B.C., some so-called primitive Caucasians expanded eastward to the Xinjiang area as far as the area around Hami and Lop Nur. By the end of the second millennium, another group of people from Central Asia started to move over the Pamirs and gradually dispersed in southern Xinjiang. These western groups mixed with local Mongoloids¹⁶ resulting in an amalgamation of culture and race in middle Xinjiang east to the Tianshan.

(3) Based on preliminary studies at the Lin-ya 林雅 cemetery (also known as the Tianshan Beilu 天山北路 cemetery) in Hami City, we have discovered two types of painted pottery which may indicate two ethnic groups from different areas. One (group A) is similar to the cultural remains of the Siba Culture which has its origins in the Hexi corridor in Gansu. The other (group B) may be from the Altai 阿勒泰 grassland in northern Xinjiang, or even further to the north.¹⁷ [Figure 5].

Up to the present, we have yet to find any trace of physiologically western races east of Xinjiang. This may indicate that the eastward expansion of "Western" peoples did not pass the Xinjiang area. Does this phenomenon indicate that contacts between the east and west were only limited to Xinjiang? The answer seems to be negative. In addition to the biological evidence in Xinjiang, we have fragmentary evidence in parts of China that suggest the possible presence of Western people even further to the east as early as 1000 BC. For example, two shell statues of human heads with the obvious Classical European characteristics have been discovered in the Plain of Zhou (Zhouyuan 周原), in Shaanxi 陕西 Province¹⁸ [Figure 6]. On the peak of the head of

¹² Han Kangxin, "Xinjiang kongquehe gumugou mudi rengu yanjiu (Anthropological characteristics of the human skulls from the ancient cemetery at Gumugou, Xinjiang)," *Kaogu Xuebao* (Acta Archaeologia Sinica) 1986.3, 361–84.

¹³ Bergman, Folke, *Archaeological Researches in Sinkiang, Especially the Lopnor Region*. Stockholm: Thule, 1939.

¹⁴ According to radiocarbon dates, the earliest date's of Xiaohe cemetery should be earlier than 2000 BC.

¹⁵ Han Kangxin, "Xinjiang Hami Yanbulake gumu rengu zhongxi chengfen zhi yanjiu (An anthropological study of the human bones from the Yanbulak cemetery in Hami, Xinjiang)." *Kaogu Xuebao* 1990.3, 371–90.

¹⁶ Han Kangxin, "Xinjiang gudai jumin zhongzu renleixue yanjiu (An anthropological study of the ancient inhabitants in Xinjiang). *Sichou zhilu gudai jumin zhongzu renleixue yanjiu* (The anthropological study of the ancient inhabitants of the Silk Road region) (Wulumuqi: Xinjiang renmin, 1993), 1–32.

¹⁷ See note 8.

¹⁸ Yin Shengping, "Xizhou bangdiao rentou zhongzu tansuo (Investigation of the racial affinity of two Western Zhou period human heads sculpted of shell)." *Wenwu* (Cultural Relics) 1986.2, 46–49.

these figures we find incisions in the shape of “十” or other designs [Figure 6, 2–3]. In addition, recently discovered archaeological materials indicate that, around the beginning of the second millennium BC. or even earlier, objects with obvious western characteristics had already emerged in the areas east of Xinjiang. Some of them even entered the core area of Chinese civilization, the so-called Central Plains. These data demonstrate that the interaction between East and West was a historical fact from early on. In the following sections, I introduce some of these lines of evidence.

(4) Wheat. According to archaeological discoveries and the geography of domestication, the origins of wheat and barley are believed to have been in the Near East and in Western Asia. Recently, archaeological syntheses of research in the Levant have demonstrated that this is the region where wheat and barley were first domesticated, and from where their use as domesticates diffused to other regions. The results of these studies show that wheat and barley domestication started in this region at least as early as 10,000 years ago. Additionally, there was a long preceding period during which wild plants were gathered, which led up to their eventual domestication.¹⁹

Scholars have long suspected that China was a primary location of the domestication of millet, foxtail millet, and rice²⁰ But despite the fact that late Shang period (ca. 3000 B.P.) oracle bone inscriptions already include the character for *mai* (wheat) and even if the records in the *Shijing* 詩經 (the Zhou-period Chinese classic, or the *Book of Songs*), may also contain references to wheat-like grains,²¹ wheat and barley could not possibly have originated as domesticates in China. Some scholars even go so far as to say that “Because the character for wheat has been found on oracle bones that date to 1300 BC, and since barley and wheat were most likely introduced together into the region, we can assert that these cereals entered in to China during the second millennium BC.”²² In contrast, other Chinese scholars continue to insist that wheat could have been domesticated independently in China.²³ What was, in fact, the true situation regarding wheat? Below, I examine the archaeological evidence that relates to the question of the origins of wheat in China. Does the area meet the requirements for having been an original place for wheat domestication?

Dozens of years ago, prehistoric wheat was reported to have been discovered in China in Shanxi and Anhui, but the authenticity and dating of these finds has been disputed.²⁴ According to reliable archaeological evidence from within China, pre-

¹⁹ Ofer Bar-yosef, “The Natufian Culture in the Levant, Threshold to the Origins of Agriculture,” *Evolutionary Anthropology* 6.5 (1998), 159–77.

²⁰ Yan Wenming, “Zhongguo nongye he xuyangye de qi yuan (The origin of agriculture and animal domestication in China),” *Liaohai wenwu xuekan* (Cultural Relics in Liaohai), 1989.2, 22–30.

²¹ Pulleyblank, Edwin G., “Early Contacts Between Indo-European and Chinese,” *International Review of Chinese Linguistics*, 1.1 (1996): 12–13.

²² He Bingdi [Ho, Ping-ti], “Zhongguo nongye de bentu qi yuan (The native origin of Chinese agriculture),” *Nongye kaogu* (Archaeology of Agriculture) 1985.2: 72–125. (Originally published in 1977).

²³ Li Pan, “Zhongguo putong xiaomai de qi yuan yu chuanbo (The origin and propagation of Chinese *Triticum aestivum*),” *Shijie Nongye* (World Agriculture) 10 (1992), 44–47.

²⁴ See An Zhimin, “Zhongguo shiqian shiqi zhi nongye (The Agriculture of Chinese Prehistory),” *Yanjiing shehui kexue* (Yenching Social Science) II (1949), 36–58; also Yang Jianfang, “Anhui diaoyutai chutu xiaomai niandai shangque (Deliberating the question about the date of the wheat unearthed at the Diaoyutai site, Anhui),” *Kaogu* 1963.1, 630–31.

Qin discoveries of wheat and barley have been made in three regions: In Xinjiang; in the Gansu/Qinghai region; and in the Shaanxi/Henan area.²⁵ Numerically, the finds in Xinjiang are the most frequent, having been discovered in ten different locations. One or two locations have been identified in each of the other provinces mentioned: Qinghai, Gansu, Shaanxi, and Henan [Figure 7]. In Xinjiang, two of the sites where the finds have been made (Gumugou and Xiaohe) have been dated to ca. 2000 BC, while the rest date to near the end of the second millennium or to the beginning of the first millennium BC. The site of Donghuishan 東灰山 in Minle 民樂 County, Gansu has wheat remains that have been radiocarbon-dated to ca. 2500–3000 BC.²⁶ The two finds in Qinghai Province probably do not date to earlier than the middle of the second millennium BC. In Shaanxi, one find comes from a context that dates to the pre-Zhou period (terminal second millennium BC), and the other is associated with the Keshengzhuang 客省莊 culture²⁷ (which flourished at the end of the third millennium BC). In Henan, one sample comes from a so-called “Xia” context (ca. 1600 BC), and the other from a Shang context at Anyang (ca. 1200 BC).

According to these data, wheat finds diminish from east to west, and earlier finds are generally found to the west. It is not difficult, therefore, to envision that cereals like wheat followed a path from Central Asia through Xinjiang and the Hexi corridor into the Central Plains, along routes of trade and interaction.²⁸ From the point in the third millennium when wheat first entered China, until the second stage during the second millennium BC when wheat finally reached the Central Plains, we have nearly a thousand years, during which wheat cultivation very gradually moved eastwards. It is still unclear why the area of its use seems quite restricted even after wheat entered the Central Plains. It seems that for various reasons, including those related to soil composition, climate, and the local agricultural techniques, wheat could not supplant the traditional crops grown in the Yellow River Valley.²⁹

(5) Mace heads. Maces are artifacts whose origins lie in the Near East. They are symbols of power and status, and are also weapons of war. According to present data, the earliest mace-heads have been discovered in the Near East, North Africa, and in Mesopotamia. An unexpected and remarkable hoard of mace heads has also been found in the cave of Nahal Mishmar located to the west of the Dead Sea. This collection contained more than 400 metal objects, a fairly large number of which were scepters and mace-heads. These artifacts date to the first half of the 4th mil-

²⁵ Li Shuicheng 2004, “Kaogu suojian xianqin shiqi de maili zuowu (Pre-Qin period wheat and barley discovered by archaeological excavation).” Unpublished paper, forthcoming in *Yazhou Wenming* (The Civilization of Asia).

²⁶ Li Shuicheng and Mo Duowen, “Donghuishan yizhi tanhua xiaomai niandai kao. (A study on the date of the wheat unearthed at the Donghuishan site, Gansu),” *Kaogu yu Wenhua* (Archaeology and Cultural relics) 6 (2004), 51–60.

²⁷ This is based on the purported discovery of wheat stalks on top of a house wall at the site of Zhaojialai 趙家來 in Wugong 武功, Shaanxi. Whether these discoveries are in fact wheat remains to be demonstrated by further analysis.

²⁸ Prof. Zhang Zhongpei studied the cemetery at Donghuishan and believes that the wheat remains from the site were imported from the West. See Zhang Zhongpei, “Donghuishan mudi yanjiu (Donghuishan Cemetery research).” *Zhongguo wenhua yanjiusuo xuebao* (Journal of Chinese Studies, Hong Kong), New Series, 6 (1997), 287–323.

²⁹ Huang, Qixü, “Huanghe liuyu xinshiqi shidai nonggeng wenhua zhongde zuowu (On the Neolithic Crops in the Yellow River Valley),” *Nongye kaogu* 1982.2, 55–61; 1983.1, 39–50; 1983.2, 86–90.

lennium BC,³⁰ and this discovery demonstrates that mace heads have their origin in the fourth millennium in the Near East. In ancient Egypt, Mesopotamia, and Asia Minor, in addition to the presence of large numbers of mace heads, maces are often depicted in artwork, held in the hands of the elite and powerful. Such images can be found in murals, stone sculptures, and seals. Later on, after the expansion of Near Eastern civilization, maces spread into the grassland areas of other regions from southeastern Europe in the west to the Ural Mountains in the east.³¹

Artifacts similar to the above mentioned mace heads have also been found in the area of modern China. These are distributed mainly in Xinjiang, Gansu, and the western parts of Shaanxi [Figure 8]. The shape of these artifacts is identical to those found in the Near East and Central Asia. Most are made of fine stone and bronze. They date to the late Neolithic and Bronze Age periods, i.e. between 3000 and 500 BC. Based on our analysis, this artifact type has no basis in Yellow River civilization, but instead should be considered a cultural factor derived from other regions. Most likely it came into China from Central Asia. The basis for this impression is as follows: First, Near Eastern maces are found in earlier contexts, and are much more numerous. In general, the mace heads that have been found in the Chinese areas are later than those from the Near East and are fewer in number. Secondly, the mace heads that have been found in Chinese territory are found in the northwest and are very infrequent in the Central Plains.

Thirdly, in the Near East, mace heads were ritual objects that symbolized a king's authority and social standing. In contrast, from very early on, the Yellow River Valley civilizations created a ritual system that incorporated various types of indigenous axes but did not typically include mace-heads.³² The data show that mace-heads from the Near East traveled West and North through Asia Minor and the Caucasus, into southeastern Europe, the Black Sea area and to the banks of the Caspian Sea. In the Eastern direction, they crossed the Iranian Plateau, and entered the entire Central Asian grasslands area. It is quite clear that the mace-heads found in parts of China passed through Central Asia, and their presence is a result of interconnections between Eastern and Western Asia [Figure 9].

(6) Metallurgy. Some western specialists have proposed that the earliest use of metals occurred around 6,000 BC, in Anatolia. According to this view, prior to the advent of tin-bronze production there was a long period during which raw copper and arsenic-bronze were produced. Eventually, Anatolian metal using culture gradually diffused to other regions and by ca. 2000 BC metal smelting technology had entered China, by way of the Caucasus and Iran.³³ It now seems, however, based on recent archaeological discoveries, that this theory of metallurgical origins in China is untenable.³⁴

³⁰ Roaf, Michael, *Cultural Atlas of Mesopotamia and the Ancient Near East* (New York: Facts On File, 1999), 71.

³¹ Li, Shuicheng, 2002a, "The Mace-head: An Important Evidence of the Early Interactions along the Silk Roads", UNESCO International Symposium on the Silk Roads, In *Commemoration of the completion of the Hirayama Silk Roads Fellowships Programme*, 2002, 157-60.

³² One ivory mace head has been discovered at the Central Plains site of Erlitou.

³³ Tylecote, R. F., *A History of Metallurgy* (London: The Metals Society, 1976), 11.

³⁴ Slag from copper smelting and a small bronze knife have been discovered at the Majiayao Culture site of Linjia林家 (ca. 3000 BC) in Dongxiang 东乡 County, Gansu Province, in 1977.

The sophistication of ancient bronze production technology in China itself is quite well known. From the late Shang until the Western Zhou periods, bronze production and use in China reached its peak. Although this occurred in the Central Plains, it was actually in northwest China that metallurgy initially appeared. In addition, the earliest objects of alloyed bronze³⁵ are found in this region, and moreover, it is also in this region that the majority of early bronze objects³⁶—more than 1000 items in all—have been found so far in China³⁷ [see Figure 10].

Three culture-spheres have been identified in China during the 2nd millennium BC. These include the Erlitou culture in the Central Plains, the Qijia culture-sphere in the Gansu area, and the Siba culture-sphere in the Hexi corridor and throughout eastern Xinjiang [Figure 11]. In terms of craft technology, all three of these regions experienced a development from copper to bronze metallurgy. However, they differ in their development of alloys. Erlitou and Qijia culture metallurgy evolved from pure copper metallurgy to tin-alloyed bronze production. Siba metallurgy, in contrast, probably evolved from pure copper to arsenical copper and then to tin bronze. We can conjecture several possible reasons for these regional differences:

A. There are many differences between the chemical compositions of the copper ore available in each of these culture-spheres. According to geological investigations, rich arsenical copper ores have been located on the northern slope of the Qilianshan Mountains, located along the Hexi Corridor. Thus it would have been easy for the local Siba people (including those in eastern Xinjiang) to recognize and utilize these mineral resources, and to grasp the technique of using arsenical copper alloys. However, these kinds of ores are rare in the regions inhabited by Qijia culture people, or those of the Erlitou culture. This may be the reason why the Qijia and Erlitou cultures didn't pass through the technical stage of making arsenical copper.

B. The Siba culture is found in the area of the Hexi corridor abutting eastern Xinjiang. The contacts and mutual influences between these two areas and Central Asia went through western Xinjiang, and are most likely the reason for the presence of arsenical bronze in the Siba culture. According to research on the history and archaeology of metallurgy, arsenical bronze is the first dualistic-alloy made by humans, and arsenical copper initially appeared in western Asia, circa 4000 BC, and then gradually spread to the Caucasus region and Central Asia. During the first half of the 2nd millennium BC, a very important centre of arsenical copper appeared in the Urals, and it continued to spread to the east. This is very important for understanding the existence of arsenical copper in eastern Xinjiang and in the western part of the Hexi corridor, and also the influence that Central Asia had on later cultures in these areas.³⁸

³⁵ See note 34.

³⁶ The date of these "early bronze objects" (including copper objects and bronzes) predate 1500 BC.

³⁷ Li Shuicheng 2002c, "Xibei zhongguo de zaoqi yetongye ji quyu wenhua hudong (The earliest metallurgy and interaction of different areas in Western China)," *Tulufanxue yanjiu* (Turfanological Research) 2002.2, 31–44.

³⁸ Mei Jianjun, Liu Guorui, and Chang Xi'en, "Xinjiang dongbu diqu chutu zaoqi tongqi de chubu fenxi he yanjiu (Preliminary analysis of early bronzes from Eastern Xinjiang)," *Xiyu yanjiu* (Study on the western area of China), 2002.2, 1–10.

In sum, the early development of metallurgy in northwest China is an incontrovertible fact. But the origin of metallurgy in this region, on the other hand, has been a highly controversial issue for many years. Scholars are strongly divided in part because many problems related to this question have yet to be addressed. On the basis of the archaeological materials, there were at least three centers of metallurgical development in northern China by around 2000 BC, and it has proven extremely difficult to identify which of these should be given preeminence. The Xinjiang and Hexi corridor area clearly stand in the way of any imposition of foreign techniques into China. Some scholars have already voiced the argument that certain bronze objects demonstrate western influence on bronze metallurgy in the area of modern China.³⁹ Regarding these issues, perhaps the Hehuang area has the most relevant data so far. A smelted copper knife belonging to the Majiayao culture (ca. 3000 BC) was found here, and is possibly the earliest copper object to have been found in China. Is this area, therefore, the founding of metallurgy in ancient China? This question will have to be answered by future research. Some Western scholars have suggested that bronze metallurgy may have entered into China along a prehistoric "Silk Road" because the metal objects found in the Qijia culture predate those found in the Central Plains.⁴⁰ This hypothesis is not without merit, yet it lacks the intermediary data that would support such a connection. We believe that metallurgy in Western China was influenced by the eastward expansion of Western metallurgical techniques, but the fact that arsenical copper sources were naturally available in this area should not be overlooked. That is to say, the development of metallurgy in China undoubtedly had both foreign influences and local, indigenous elements and during its development it incorporated both of these.⁴¹

Conclusion

We have explored several aspects of the relationships between prehistoric cultures in the East and West. Clearly, the first period of substantial communication between the two areas occurred during the late Neolithic, approximately 3000 BC. After around 2000 BC, the intercourse between these areas increased in both frequency and intensity. The contact, however, remained indirect and involved, at first, an intrusion into present-day Xinjiang of cultural elements from West Asia and Central Asia. Thereafter, via the conduit of the Hexi corridor, the influence extended to the Hehuang area,⁴² and eventually to the Central Plains. At the same time, the civilizations of the Yellow River valley stretched westward by means of the same routes of

³⁹ Mei Jianjun, *Copper and Bronze Metallurgy in late Prehistoric Xinjiang, Its cultural context and relationship with neighbouring regions*, BAR International Series 865, Oxford: BAR, 2000. Also see Lin Yun, "Xiandai de Zhongguo beifang xi qingtongqi (Northern Style Bronze Artifacts of the Xia Dynasty in China)," *Bianjiang kaogu yanjiu* (Archaeological research on research on China's borders) 2002.1, 1-12.

⁴⁰ Fitzgerald-Huber, Louisa G., "Qijia and Erlitou: The Question of Contacts with Distant Cultures," *Early China*, 20 (1995): 17-68.

⁴¹ See note 37.

⁴² The "Hehuang area" includes the common boundary shared by Gansu and Qinghai provinces wherein the Yellow River and Huang River flow.

communication. Xinjiang acted as a springboard for the dissemination of Chinese civilization to other regions.

At this point we can confidently disprove the proposal that "Yangshao culture came from the West" but to deny all possibilities of external influence on the development of Chinese civilization is to "stop eating for fear of choking". Understanding "external influence" is an extremely difficult proposition. It can be taken as a truism that no culture in the world has developed in complete isolation. Based upon the archaeological evidence we can say that interactions between the major centers of ancient civilizations in the old world began at a very early date. However, the interactions took different forms and the influences felt by different culture varied tremendously. Sometimes influence was obvious; at other times it was hidden. In some cases large-scale substitution occurred by military conquest or cultural replacement, while other cases involved borrowing that pervaded slowly and inconspicuously. In any case, it is the interactions between the different civilizations that stimulate cultural growth everywhere. The civilization of the Yellow River valley was located at a great distance from other centers of civilization and, due to geographical reasons its contact with these areas was limited. But the absence of contact between these areas could not continue forever.

The venerable scholar Prof. Xia Nai once proclaimed, "I believe that the origins of Chinese civilization are based primarily on indigenous developments, but this does not preclude the possibility that some foreign influences affected this development at various times. These foreign influences are not limited to influences from places now within the boundaries of modern China but may also include elements from external areas. China was never completely isolated from other regions, but Chinese civilization should nevertheless be considered native born. Chinese civilization has its own individuality, its own special customs, and its own special character."⁴³ When all is said and done, there are limits to the effects of external cultural influences on the core of Chinese civilization. As another well-known scholar has pointed out, "China is like a huge geographical cell and has remained relatively closed off and isolated from the outside world. This has had a profound influence on the indigenous nature of the origin ancient Chinese civilization and has caused it to take a relatively isolated development route. The connections between Chinese civilization and the prehistoric cultures of neighboring regions can only be said to have reached a certain level."⁴⁴ Even though this is the case, we still should still recognize that sometimes outside cultures had a vigorous, lively side whose "corruption" of the core of Chinese civilization was not entirely without benefit.

Finally, I wish to use this occasion to express my profound respect for Dr. J.G. Andersson for his pioneering work, which laid the foundation for modern Chinese archaeology.

2004, Beijing, at the Lanqi'ying Housing Development

⁴³ Xia Nai, *Zhongguo wenming de qi yuan* (The Origins of Chinese Civilization) (Beijing: Wenwu, 1985), 100.

⁴⁴ Yan Wenming, "Zhongguo shiqian wenhua de tongyixing yu duoyangxing (Unity and Diversity of Chinese Prehistoric Cultures)." *Wenwu* (Cultural Relics) 1987.3, 38–50.

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- Zhang Zhongpei 張忠培, "Donghuishan mudi yanjiu 東灰山墓地研究 (Donghuishan Cemetery research)." *Zhongguo wenhua yanjiusuo xuebao* 中國文化研究所學報 (Journal of Chinese Studies, Hong Kong), New Series, 6 (1997), 287–323.

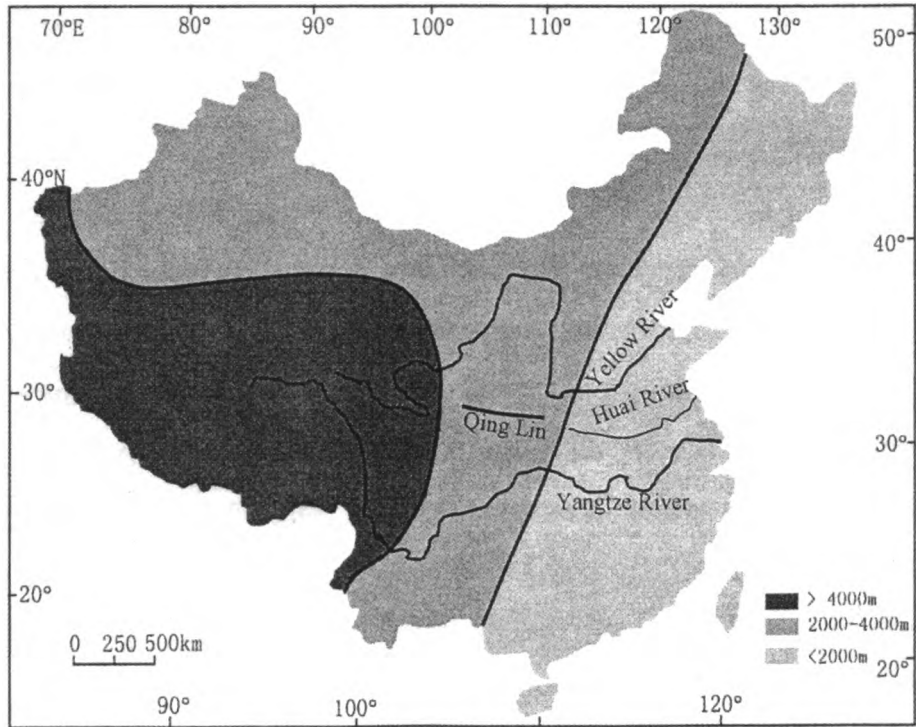


Figure 1. Landscape map of China.

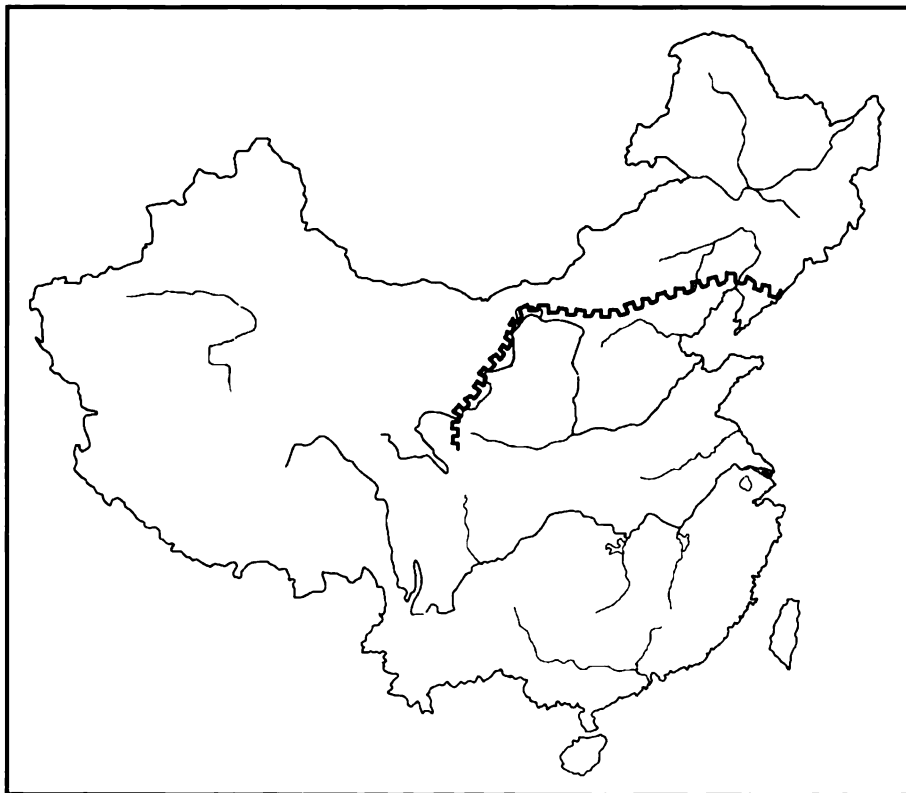


Figure 2. Sketch map of the Great Wall of the Qin Dynasty, China.

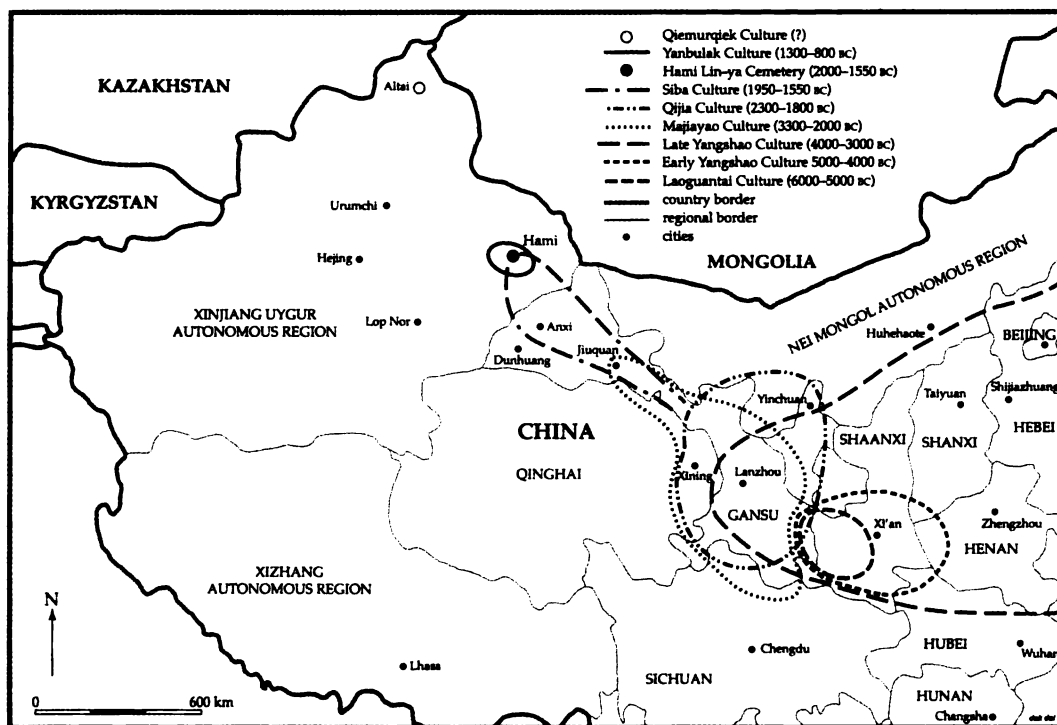


Figure 3. The westward expansion of prehistoric cultures in Northwest China.

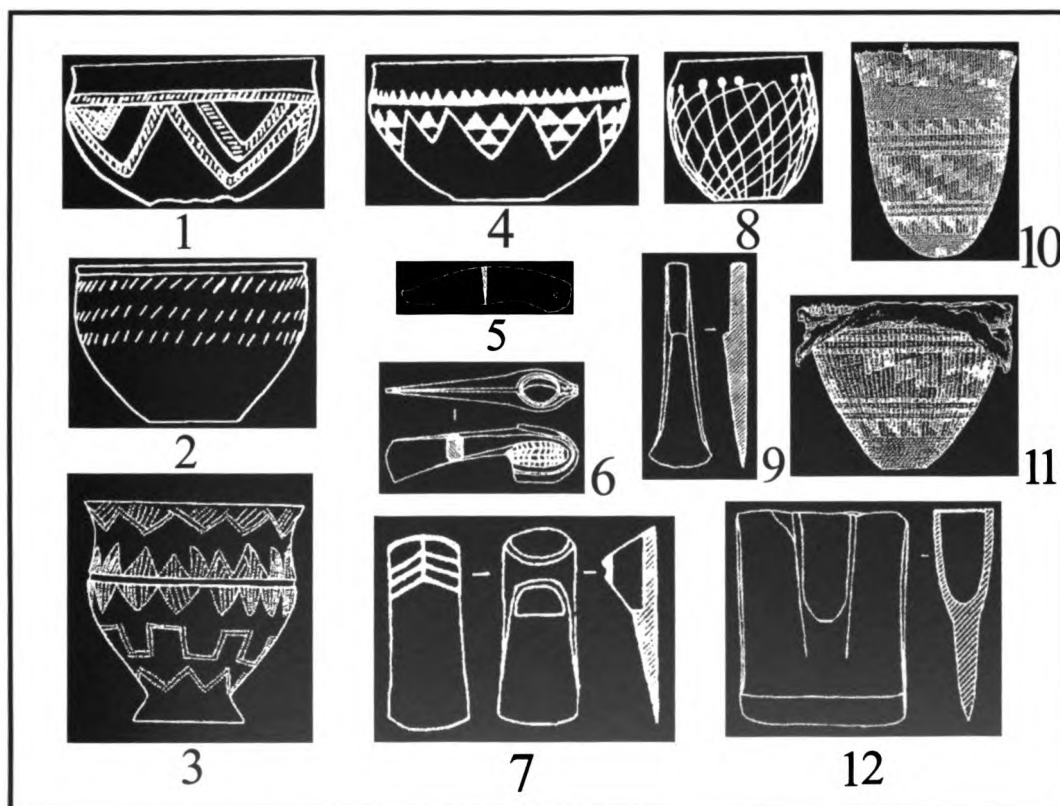


Figure 4. Andronovo Culture objects from Xinjiang.

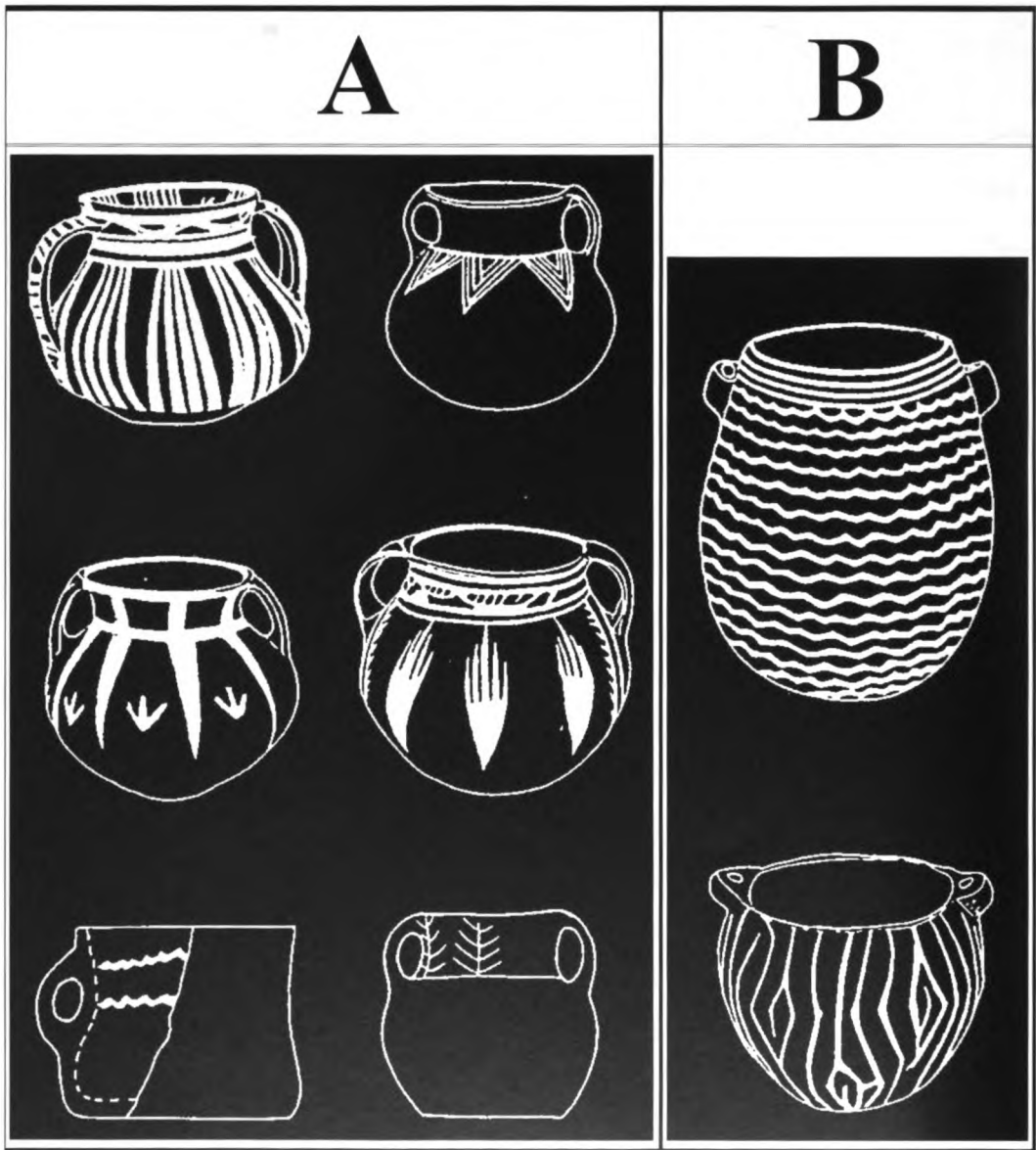


Figure 5. Funerary painted pottery from the Lin ya cemetery in Hami.

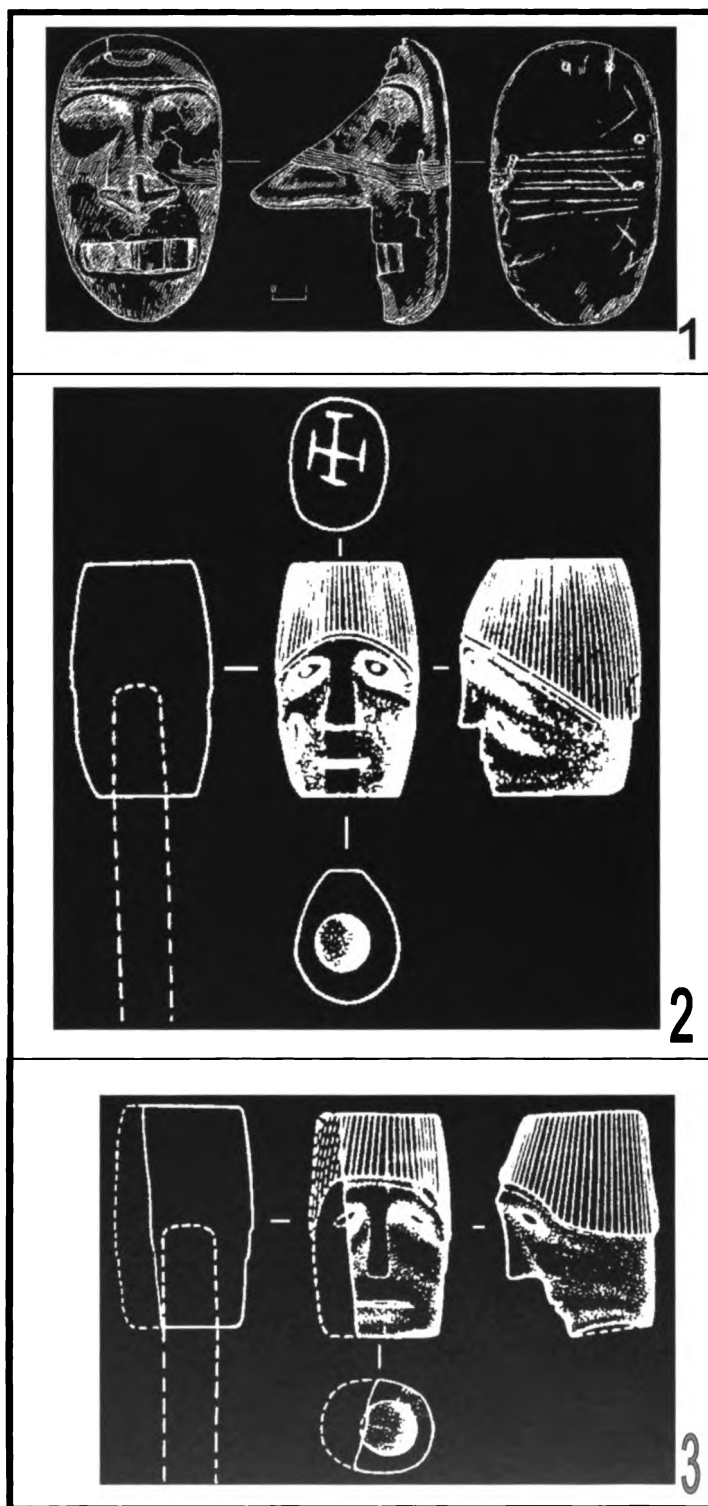


Figure 6. Figurines in the shape of human heads.

6.1. Wood-carved head from the Xiaohe 小河 cemetery, near Lop Nor in Xinjiang.

6.2–3. Shell-carved head from the Zhou Plain (Zhouyuan 周原), in Shaanxi Province.

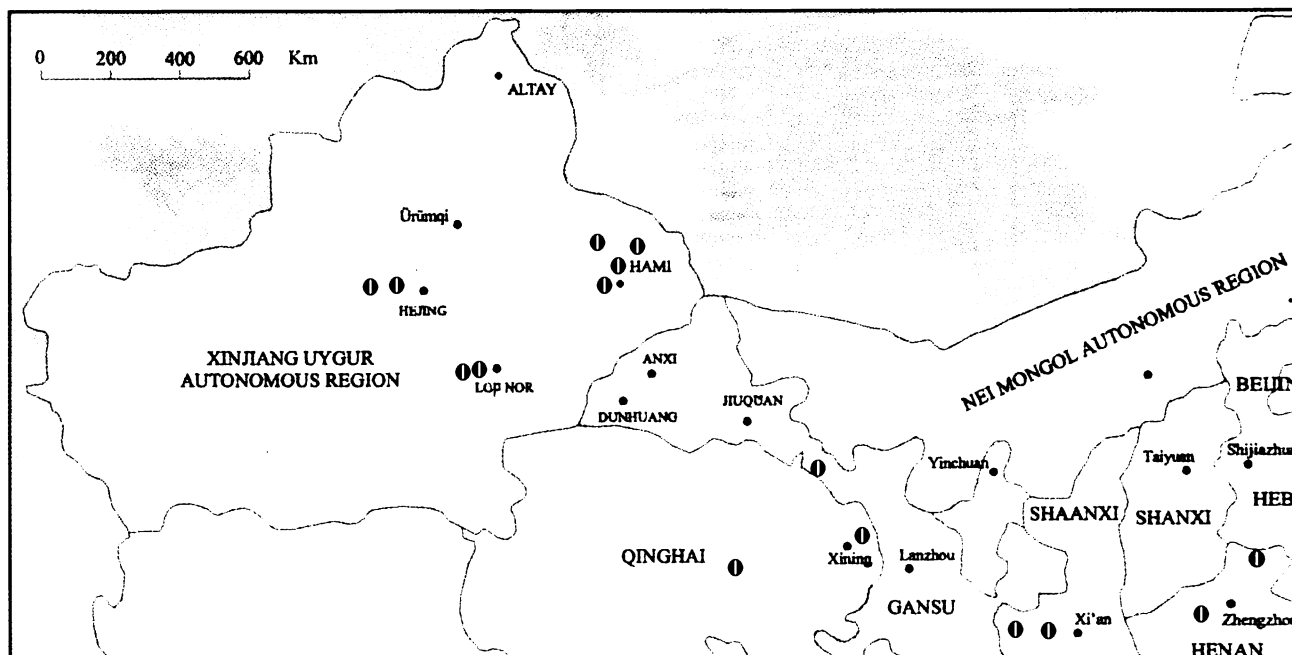


Figure 7. Sketch map of the distribution of wheat in China.

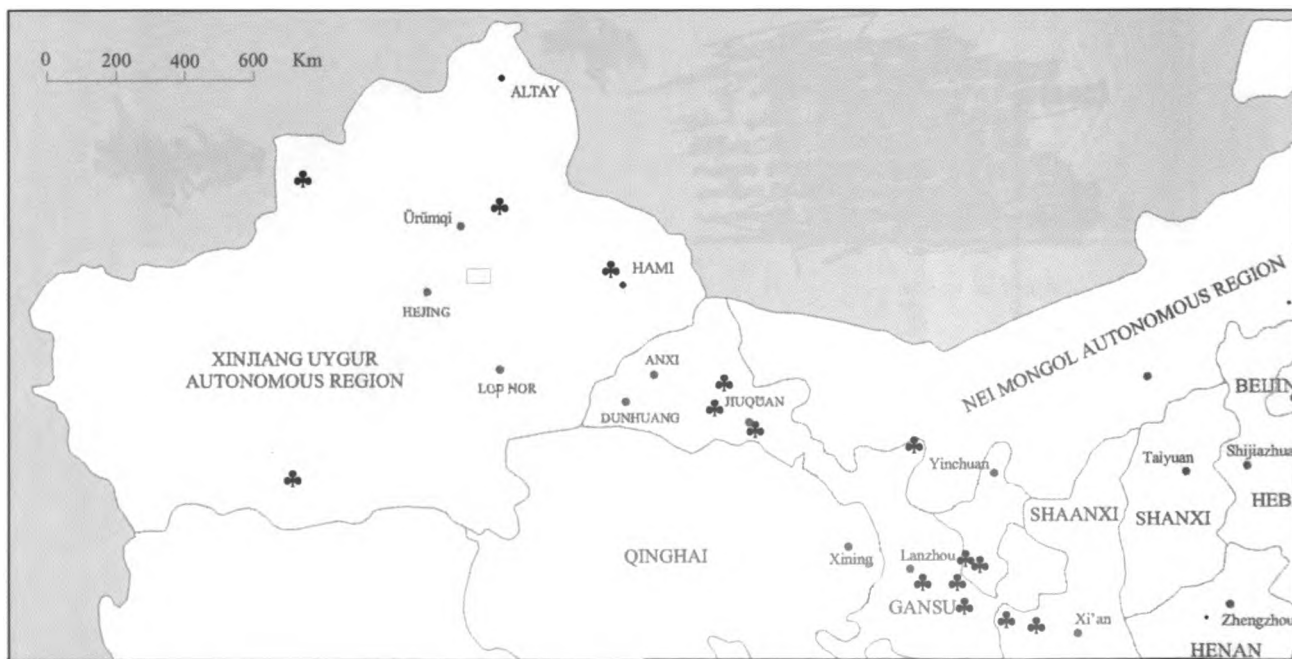


Figure 8. Sketch map of the distribution of mace heads in China.

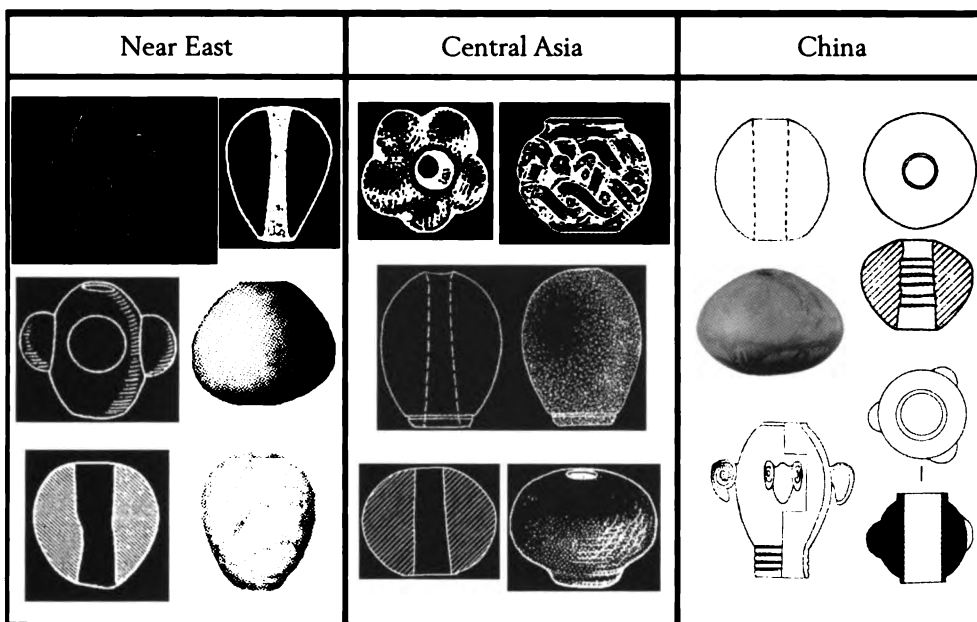


Figure 9. A comparison of mace-heads from the Near East, Central Asia and China.

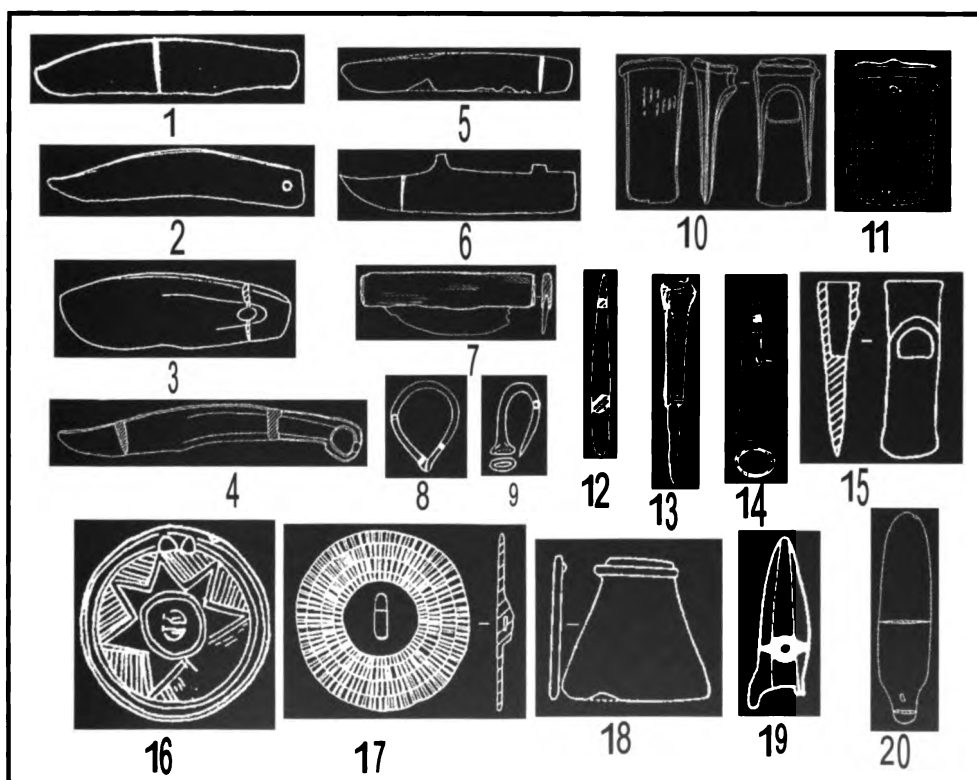


Figure 10. Copper and bronze objects from Northwest China.

No. 1 is from the Linjia site in Gansu (Majia Yao Culture); objects 2, 3, 6, 11, 15, 17 and 20 are from the Lin'ya cemetery in Xinjiang; 4, 8, 10, 14 and 19 from the Gangu'ya cemetery in Gansu (Siba Culture); 5, 7, 13, 16 and 18 from Qinghai and Gansu (Qijia Culture); no. 12 is from the Zhaobitan site in Gansu (Machang Culture).

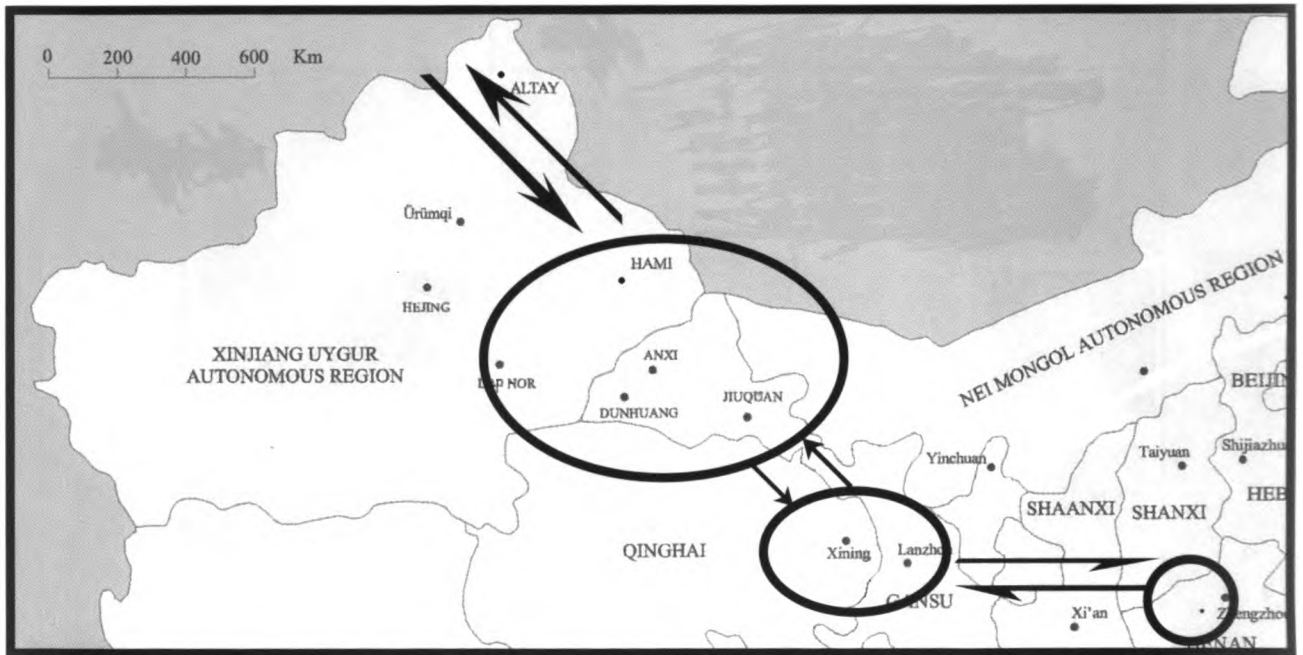


Figure 11. Sketch map of three metallurgical centers in China.

Qijia and Seima-Turbino: The Question of Early Contacts between Northwest China and the Eurasian Steppe

by

Jianjun Mei

The Qijia culture, one of the six early archaeological cultures first identified by Johan Gunnar Andersson in Gansu, Northwest China during the 1920s, has attracted considerable scholarly interest over the past two decades due to its relatively rich finds of metal objects, which are of great significance for understanding the beginnings and early development of bronze metallurgy in China.

Some recent research has argued that the Qijia culture may have had contacts with the cultures further to the west and north, especially with the Seima-Turbino complex in the Eurasian steppe.¹ This paper is intended to review this argument in the light of recent archaeological and archaeo-metallurgical evidence from Northwest China.² Having first asserted that strong cultural influence from the Eurasian steppe emerged in Northwest China no later than the beginning of the second millennium BC, the paper proceeds to raise a number of questions regarding the nature and patterns of early contacts between Northwest China and the Eurasian steppe.³

¹ Louisa G. Fitzgerald-Huber, "Qijia and Erlitou: the question of contacts with distant cultures," *Early China* 20 (1995), 43–52.

² In this paper, the term "Northwest China" is loosely used to refer to the present-day provincial regions of Gansu, Qinghai and eastern Xinjiang, though it should be noted that the whole region of Xinjiang and the western parts of Gansu and Qinghai have conventionally been termed as 'Eastern Central Asia' in many academic writings, see V. M. Masson, "The environment," in A.H. Dani & V. M. Masson, eds. *History of Civilizations of Central Asia, Vol. 1, The dawn of civilization: Earliest times to 700 BC* (Paris: UNESCO Publishing, 1992), 29–44; An, Zhimin, "The Bronze Age in eastern parts of Central Asia," in A.H. Dani & V. M. Masson, eds. *History of Civilizations of Central Asia, Vol. 1*, 319–36.; Victor Mair, *The Bronze Age and Early Iron Age Peoples of Eastern Central Asia* (Washington: Institute for the Study of Man, 1998), 4–5; and Nicola Di Cosmo, "Ancient Xinjiang between Central Asia and China," *Anthropology & Archeology of Eurasia* 34.4 (1996), 87–101, and *Ancient China and Its Enemies: The Rise of Nomadic Power in East Asian History* (Cambridge: Cambridge University Press, 2002), 13–20.

³ Some arguments presented in this paper have already been published in Chinese, in Mei Jianjun and Takahama, Shu, "Saiyima-Tubinnuo xianxiang he zhongguo xibei diqu de zaoqi qingtong wenhua (The Seima-Turbino phenomenon and early bronze cultures in Northwest China)," *XJWW* 2003.1, 47–57 (for abbreviations of journal names, see the References). The current English version has been reorganized and augmented with new ideas, and information that only has become available recently.

It is argued that not only cultural transmission but also local innovations may have played a crucial part in characterizing the complex and diverse patterns of cultural growth and interaction in early Northwest China.

Qijia and Seima-Turbino: the argument

One of the major contributions of J. G. Andersson to Chinese archaeology is his identification of six major cultural stages, namely Qijia, Yangshao (Banshan), Machang, Xindian, Siwa and Shajing, among prehistoric remains in Gansu, Northwest China.⁴ Although his assessment of Qijia as older than Yangshao and Machang later proved erroneous, his pioneering work is still widely recognised as a tremendous achievement in the early stage of archaeological studies of Northwest China.⁵ Even today, many observations made by Andersson decades ago remain stimulating and significant for our understanding of the prehistory of Northwest China. For example, he was one of very few scholars who first noticed the extension of Machang pottery to the area of the western Hexi Corridor (see Fig. 1) and observed a close relationship between the painted pottery from Xinjiang and that of Machang.⁶ Recent archaeological finds from eastern Xinjiang and the Hexi Corridor in Gansu have provided some supporting evidence for such an observation, which, I believe, has important implications for understanding the beginnings of early cultural contacts between Gansu and Xinjiang.⁷

Andersson was a pioneer of the investigation of prehistoric East-West contacts based on archaeological evidence.⁸ Although his earlier assumption of a western origin of Chinese painted pottery was later abandoned as evidence for the indigenous

⁴ Fig. 1; Johan Gunnar Andersson, "Preliminary report on archaeological research in Kansu," *Memoirs of the Geological Survey of China*, Series A, No. 5 (1925), 19–24.

⁵ Shui Tao, *Zhongguo Xibei Diqu Qingtong Shidai Kaogu Lunji* (Papers on the Bronze Age Archaeology of Northwest China) (Beijing: Kexue, 2001), 100.

⁶ Andersson, J.G., "Researches into the prehistory of the Chinese." *BMFEA* 15 (1943), 278–80. On p. 286, Andersson made the following acute observation: "As was proved by the finds of the Hedin expedition, the Kansu type of Ma Chang ends at the Yümen corridor. Beyond that point we meet, in five widely spread places, a well-defined Sinkiang province of painted pottery. These ceramics – as far as we know them at present – have nothing to do with Yang Shao. They retain their own type, though with a marked likeness to Ma Chang, indicating their probable age."

⁷ I have suggested elsewhere that the westward expansion of the Machang culture may have encountered the southward movement of Afanasevo people from southern Siberia in eastern Xinjiang during the late third millennium BC (Mei Jianjun, *Copper and Bronze Metallurgy in Late Prehistoric Xinjiang: Its Cultural Context and Relationship with Neighboring Regions* [Oxford: Archaeopress, 2000], 58–62). For more discussion of the Machang expansion from Gansu into Xinjiang, see Shui Tao, "Xinjiang qingtong shidai zhu wenhua de bijiao yanjiu (A comparative study of the Bronze Age cultures in Xinjiang)," *Guoxue Yanjiu* (Studies in Sinology), 1 (1993), 468; and Li Shuicheng, "Hexi diqu xinjian Majiayao wenhua yicun ji xiangguan wenti (The remains of the Majiayao culture newly encountered in the Hexi region and relevant problems)," in Su Bai, *Su Bingqi Yu Dangdai Zhongguo Kaoguxue* (Su Bingqi and Archaeology in Contemporary China) (Beijing: Kexue, 2001), 132.

⁸ The following statements can be found in Andersson ("Preliminary report on archaeological research in Kansu," 30): "Our discovery of an unparalleled development of the Yang Shao culture in Kansu has confirmed the view expressed in my earlier communications that the migration of the painted pottery across Central Asia to the valley of the Huang Ho must have taken place over the natural highway between the Pei Shan and the Nan Shan in N.W. Kansu, reaching the Huang Ho in the region of Lanchow, the capital of modern Kansu, that is the centre of the area studied by me in 1923–24."

development of painted pottery in Central-North China gradually accumulated,⁹ the theme of East-West contacts in prehistory remains a central issue in the study of early China. Around the mid-twentieth century, the magnificent bronze finds from the Anyang excavations in the Central Plains of China once again brought early East-West contacts into focus, giving rise to a longstanding debate on diffusion versus independent invention regarding the beginnings of bronze metallurgy in China.¹⁰ The representative diffusionist view of Max Loehr¹¹ claimed that metallurgy was introduced into China from the outside because 'primitive stages have, in fact, nowhere been discovered in China up to the present moment'. Considerable new bronze finds since the 1950s, many being earlier than the Anyang bronzes, have made it possible for a number of scholars to argue for indigenous origins of metallurgy in China.¹² Over the past two decades, the debate has become increasingly intense among scholars, with substantial discussion being focussed on early metal finds from Gansu and Qinghai provinces, especially those associated with the Qijia culture (Fig. 1).¹³

The Qijia metal objects are indeed extraordinary and intriguing in terms of their quantity, typology, and chronology. So far, more than one hundred copper and

⁹ In contrast to his earlier assumption of a western origin for Chinese painted pottery, Andersson seemed to have taken a cautious position in a later publication of 1943: "When travelling through Russia several times between 1925 and 1938 I took the occasion to study the Tripolje urns in the Hermitage in Leningrad and in the Historical Museum in Moscow. I was struck by two features, the similarity in the shape of the urns, in painted design and in the pigments. But at the same time I could not avoid noting how widely inferior these vessels were, in more irregular shape, in poorer build, in coarser ware and in less careful painting, when compared with the Kansu masterpieces, which stand alone in the world in artistic conception as well as in exactness of execution..... At present the problem Tripolje-Yang Shao has revealed no connection across the desert and oasis world" (Andersson, "Researches into the prehistory of the Chinese," 284, 286). For a detailed and excellent analysis of the development of Andersson's opinions on the origins of Chinese painted pottery, please see Chen Xingcan, *Zhongguo Shiqian Kaoguxue Shi Yanjiu (1895-1949)* (A Study of the History of Archaeology of Prehistoric China) (Beijing: Sanlian Press, 1997), 116-33, 302-309; also refer to William Watson, *Cultural Frontiers in Ancient East Asia* (Edinburgh: Edinburgh University Press, 1971), 30; Yan Wenming, "Gansu caitao de yuanliu (The origins of Gansu painted pottery)," *WW* 1978.10, 74; and Li Shuicheng, "The interaction between Northwest China and Central Asia during the second millennium BC: An archaeological perspective." In Katie Boyle et al., *Ancient Interactions: East and West in Eurasia* (Cambridge: McDonald Institute, 2002), 171-2, for discussions of the indigenous development and expansion of painted pottery cultures in North China.

¹⁰ For an excellent review of this debate, see Donald B. Wagner, *Iron and Steel in Ancient China* (Leiden, New York and Köln: E.J. Brill, 1993), 28-33.

¹¹ Max Loehr, "Weapons and tools from Anyang and Siberian analogies," *American Journal of Archaeology* 53 (1949), 129.

¹² Noel Barnard, *Bronze Casting and Bronze Alloys in Ancient China* (Tokyo: Australian National University and Monumenta Serica, 1961), "Further evidence to support the hypothesis of indigenous origins of metallurgy in ancient China," in David N. Keightley, ed., *The Origins of Chinese Civilization* (Los Angeles: University of California Press, 1983), 237-77; Noel Barnard and T. Sato, *Metallurgical Remains of Ancient China* (Tokyo: Nichiosha, 1975), 1-16; Cheng, Te Kun, "Metallurgy in Shang China," *T'oung Pao* 60.4/5 (1974), 209-29; Ho Ping-Ti, *The Cradle of the East: An Inquiry into the Indigenous Origins of Techniques and Ideas of Neolithic and Early Historic China, 5000-1000 B.C* (Hong Kong: Chinese University of Hong Kong), 177-221.

¹³ An Zhimin, "Shilun Zhongguo de zaoqi tongqi (On early copper and bronze artifacts in China)," *KG* 1993.12, 1110-19; Fitzgerald-Huber, "Qijia and Erlitou," Sun Shuyun and Han Rubin, "Zhongguo zaoqi tongqi de chubu yanjiu (A preliminary study of early Chinese copper and bronze artifacts)," *KGXB* 1981.3, 287-301; Mei Jianjun, "Guanyu Zhongguo yejin qiyuan ji zaoqi tongqi yanjiu de jige wenti (On the origins of metallurgy and the studies of early copper objects in China)," *TY* 2 (2001), 57-68. For detailed studies of the Qijia culture, see Zhang Zhongpei, "Qijia wenhua yanjiu (A study of the Qijia culture)," *KGXB* 1987.2, 153-76; and Debaine-Francfort, *Du Néolithique à l'Âge du Bronze en Chine du Nord-Ouest*.

bronze objects have been excavated or recovered from various Qijia sites, such as Huangniangniangtai in Wuwei county, Qinweijia and Dahezhuang in Yongjing county, Xinzhuangping in Jishishan county, Qijiaping in Guanghe county (all in Gansu province), and Gamatai in Guinan county, Qinghai province.¹⁴

These finds sharply contrast with the only four metal objects found from the earlier sites of Majiayao and Machang cultures of the third millennium BC, also in the Gansu region.¹⁵ The Qijia objects show a wide range of types, including knives, awls, rings, axes, mirrors, plaques and a spearhead (Fig. 2). They are dated roughly between 2300 BC and 1700 BC,¹⁶ being among the earliest metals so far discovered within the present boundaries of China. While scholars who favour the idea of independent invention take the Qijia metal finds as signs of primitive or initial stages of Chinese metallurgy,¹⁷ others would rather see them as an indication of contact with the west.¹⁸

The possible link of the Qijia metals with the west has recently come to be discussed seriously. An Zhimin¹⁹ speculates that the 'sudden' appearance of metal objects within the Qijia context probably resulted from cultural influence from the west through the prehistoric Silk Road. Debaine-Francfort²⁰ also notices that some Qijia implement types, such as the socketed axe, the back-curved knife and the mirror (see Fig. 2: I, 2, 8, 11), generally parallel those from the Eurasian steppe culture. However, it is Fitzgerald-Huber²¹ who first argues specifically for contacts between

¹⁴ For general information about the metal objects found at the Qijia sites, see Sun & Han, "Zhongguo zaoqi tongqi de chubu yanjiu," 294–99; Debaine-Francfort, *Du Néolithique à l'Âge du Bronze en Chine du Nord-Ouest*, 319–21; Fitzgerald-Huber, Review of Debaine-Francfort, p. 264; Mei Jianjun, *Copper and Bronze Metallurgy in Late Prehistoric Xinjiang*, 62; and Li Shuicheng, "Zhongguo xibei diqu de zaoqi yetongye ji quyu wenhua de hudong (The early copper metallurgy and regional interaction in northwestern China)," *TR* 2 (2002), 34. According to Li (op. cit.), 49 copper and bronze objects were found at the Gamatai site in Guinan county, Qinghai province, but the excavation report has not yet been published.

¹⁵ Sun Shuyun and Han Rubin, "Gansu zaoqi tongqi de faxian yu yelian zhizao jishu de yanjiu (Discovery of early copper and bronze artefacts in Gansu and studies of their smelting and manufacturing techniques)," *WW* 1997.7, 75–77.

¹⁶ Nearly twenty calibrated radiocarbon dates are available for some Qijia sites, see IAC (Institute of Archaeology, Chinese Academy of Social Sciences). C14: *Zhongguo Kaoguxue Zhong Tanshixi Niandai Shujuji* (Radiocarbon Dates in Chinese Archaeology 1965–1991) (Beijing: Wenwu, 1991), 272–86; Debaine-Francfort, *Du Néolithique à l'Âge du Bronze en Chine du Nord-Ouest*, 361; and Ye Maolin, "Lajia yizhi juehui niandai de chubu renshi (A preliminary understanding of the absolute dating of the Lajia site)," *Zhongguo Wenhua Bao* (Newspaper for Chinese Cultural Relics), 6 February 2004 (Academic section). Three new dates for the Lajia site in Qinghai reported by Ye are consistent with the earlier published measurements, confirming the absolute dating given here. I would like to thank Dr. Chen Xingcan for drawing my attention to Ye Maolin's report.

¹⁷ Sun & Han, "Zhongguo zaoqi tongqi de chubu yanjiu," "Gansu zaoqi tongqi," Su Rongyu et al., *Zhongguo Shanggu Jinshu Jishu* (The Metal Technology of Early China) (Jinan: Shandong Keji, 1995), 48–49; Qian Wei et al., "Xinjiang Hami Tianshanbeilu mudi chutu tongqi de chubu yanjiu (A preliminary study of the bronzes unearthed from the Tianshanbeilu cemetery in Hami, Xinjiang)," *WW* 2001.6, 88. (For English translations of some major Chinese papers arguing for indigenous origins of Chinese bronze metallurgy, see Kathryn M. Linduff et al., *The Beginnings of Metallurgy in China* (New York: Edwin Mellen Press, 2000, 129–51).

¹⁸ Karl Jettmar, "Cultural and ethnic groups west of China in the second and first millennia B.C.," *Asian Perspectives*, XXIV (1981) 2, 155; Watson, *Cultural Frontiers in Ancient East Asia*, 334; J. D. Muhly, "The beginnings of metallurgy in the Old World," in R. Maddin, ed. *The Beginning of the Use of Metals and Alloys* (Cambridge: MIT Press, 1988), 16; An Zhimin "Shilun Zhongguo de zaoqi tongqi," 1117; Fitzgerald-Huber, "Qijia and Erlitou," 38–52.

¹⁹ An Zhimin, "Shilun Zhongguo de zaoqi tongqi," 1117.

²⁰ Debaine-Francfort, *Du Néolithique à l'Âge du Bronze en Chine du Nord-Ouest*, 324.

²¹ Fitzgerald-Huber, "Qijia and Erlitou," 38–52.

Qijia and Seima-Turbino, a cultural complex or 'transcultural phenomenon' that includes a large number of early bronze remains widely distributed across northern Eurasia.²² She observes that several Qijia metal implements, notably the socketed axe and the handled knife with curved back from Xinglin (Fig. 2: 1, 2), the socketed axe from Qijiaping (Fig. 2: 11), the knife handle from Huangniangniangtai (Fig. 2: 3), the awl and knife blade each vertically inserted into bone handles from Zongzhaicun (Figure 2: 4), have their closest correlations in the Seima-Turbino complex in the Eurasian steppe (Fig. 3: 1–5). She also considers such aspects of the Qijia culture as the wide range of domesticated animals, the use of stone circles as burial markers, and the practice of suttee as indicative of contact with the general sphere of northern Asiatic pastoralists.

Fitzgerald-Huber's argument for contact between Qijia and Seima-Turbino seems to be supported by a number of recent archaeological finds. Among these finds, a socketed spearhead excavated at the Shenna site in Xining, Qinghai is most noteworthy.²³ The size of this spearhead is unusually large, being 61 cm in length. It has a downward hook and a small loop on either side of the socket respectively (Figure 2: 13). Significantly, spearheads of such a distinctive form have been seen among the finds associated with the Seima-Turbino context in southern Siberia, which include four pieces from the Rostovka burial site near Omsk in the middle Irtysh river (Fig. 3: 8).²⁴ The Rostovka spearheads are all smaller than the Shenna piece (less than 40 cm in length), with a narrow body and a sharp point, showing they are functional weapons. By contrast the Shenna spearhead would probably have been used as a ceremonial object rather than a functional one because of its large size and its blunt end. Although these differences can be observed, the obvious typological connection between Shenna and Rostovka spearheads is still striking and provides strong support to the argument for contact between Qijia and Seima-Turbino.

A knife blade horizontally inserted into a bone handle from Weijiataizi, Linxia, Gansu (Fig. 2: 7) also parallels closely a bone-handled knife recovered at the Seima

²² For a detailed discussion of the Seima-Turbino transcultural phenomenon, see Evgenii Nikolaevich Chernykh and S. V. Kuzminykh, *Drevnyaya Metallurgiya Severnoi Evrazii* (Ancient Metallurgy in Northern Eurasia) (Moscow: Nauka, 1989), and E.N. Chernykh, *Ancient Metallurgy in the USSR: The Early Metal Age* (Cambridge: Cambridge University Press, 1992), 215–34. Also cf. Marija Gimbutas, "Borodino, Seima and their contemporaries," *Proceedings of the Prehistoric Society*, 22 (1956), 143–72, and G. Parzinger, "The Seima-Turbino phenomenon and the origin of the Siberian animal style," *Archaeology, Ethnology & Anthropology of Eurasia* 1 (2000), 66–75.

²³ "Editorial Committee," ed. *Zhongguo Wenwu Jinghua* (The Treasures of Chinese Cultural Relics) (Beijing: Wenwu, 1997), no. 38. The archaeological context for the find of the Shenna spearhead remains very unclear, as pottery finds from the site indicate the existence of both Qijia and Kayue cultural elements. Such a vague situation leads some scholars to suspect its attribution to the Qijia culture (Li Shuicheng, "Zhongguo xibei diqu de zaoqi yetongye ji quyu wenhua de hudong," 35). It is indeed unusual for a spearhead of such large size and distinctive form to be recovered at a Qijia site. It would seem likely that this spearhead is a bit later than other pieces of Qijia metalwork, but no decisive evidence has yet been available to rule out the possibility of its attribution to the Qijia context. Fitzgerald-Huber ("Qijia and Erlitou," 44, note 71) once pointed out that the entire range of Seima weapons, including the socketed spearhead, the dagger and the shaft-hole axe, is conspicuously absent from the Qijia sites. The find of the Shenna spearhead signals the emergence of a new picture. Also cf. Corinne Debaine-Francfort, "Xinjiang and Northwestern China around 1000 BC: Cultural contacts and transmissions," in Ricardo Eichmann et al., eds., *Migration und Kulturtransfer* (Bonn: Dr. Rudolf Habelt GmbH, 2001), 63–64.

²⁴ Chernykh & Kuzminykh, *Drevnyaya Metallurgiya Severnoi Evrazii*, 69–70; Takahama, Shu, "On several types of copper objects of the first half of the second millennium BC from the central Eurasia," in *Metals and Civilisation* (Nara: The Research Center for the Silk Road, 2000), 114.

cemetery (Fig. 3: 6).²⁵ A further example of such a typological connection is a back-curved knife with a ring handle found at the Shangguandi site, Kangle county, Gansu, which is similar in shape to a knife excavated at the Rostovka cemetery in Siberia (Fig. 3: 3).²⁶

From this evidence, a question naturally arises: how did the Qijia culture come into contact with the Seima-Turbino complex? Recent archaeological finds from western Gansu and eastern Xinjiang, relating to the Siba culture and the Tianshanbeilu cemetery, have provided us with some clues to answer the question.²⁷ Both the Siba culture and the Tianshanbeilu cemetery are roughly dated to the first half of the second millennium BC, being slightly later than Qijia but surely overlapping with Qijia to a large extent.²⁸ According to the study of Li and Shui,²⁹ more than 270 copper and bronze objects have so far been discovered from various Siba culture sites, with over 200 being excavated from the Huoshaogou cemetery in Yumen, and the rest from such sites as Donghuishan in Minle, Ganguya in Jiuquan, and Yingwoshu in Anxi, all distributed along the Hexi Corridor in Gansu. These objects show a wide range of types, such as knives, axes, awls, bracelets, plaques, earrings, buttons, tubes, mirrors, arrowheads, spearheads, and a macehead (Fig. 4). Many of them, such as ring-pommel knives with curved backs, socketed axes, awls with bone handles, earrings with flared or trumpet-shaped ends, and button-shaped ornaments, exhibit strong typological and stylistic connections with the northern Eurasian steppe.³⁰ Similarly, a large number of copper and bronze objects have also been excavated at the Tianshanbeilu cemetery in Hami, eastern Xinjiang.³¹ The repertoire of the Tianshanbeilu metal artefacts is similar to those of Siba and Qijia, consisting

²⁵ Tian Yuzhang, "Gansu Linxia faxian Qijia wenhua gubing tongren dao (A copper blade with bone handle found in Linxia, Gansu)," *WW* 1983.1, 76; Gimbutas, "Borodino, Seima and their contemporaries," 153.

²⁶ Gansu Museum, *Sichou zhi lu Gansu Wenwu Jinghua* (The Cultural Treasures of the Silk Road in Gansu) (Lanzhou: Gansu Provincial Museum, 1994); Chernykh & Kuzminykh, *Drevnyaya Metallurgiya Severnoi Evrazii*, 123.

²⁷ Mei, "Guanyu Zhongguo yeyin qiyuan ji zaoqi tongqi yanjiu," 59–61. For detailed discussions of the Siba culture, see Li Shuicheng, "Siba wenhua yanjiu (A study of the Siba culture)," in Su Bingqi, ed. *Kaoguxue Wenhua Lunji* (Collected Papers on Archaeological Cultures), vol. 3. Beijing: Wenwu, 1993, 80–121; and Yang Jidong, "Siba: Bronze Age culture of the Gansu Corridor," *Sino-Platonic Papers* 86 (October, 1998). The full excavation report of the Tianshanbeilu cemetery has not yet been published, so the most detailed account of this important site available so far can be found in Lü Enguo et al., "Xinjiang qingtong shidai kaogu wenhua qianlun (On the Bronze Age cultures in Xinjiang)," in Su Bai, *Su Bingqi Yu Dangdai Zhongguo Kaoguxue* (Su Bingqi and Archaeology in Contemporary China) (Beijing: Kexue, 2001, 172–93).

²⁸ For calibrated radiocarbon dates of the Siba culture, see IAC (Institute of Archaeology, Chinese Academy of Social Sciences), *C14: Zhongguo Kaoguxue Zhong Tanshixi Niandai Shujuji* (Radiocarbon Dates in Chinese Archaeology 1965–1991) (Beijing: Wenwu, 1991, 272; Li Shuicheng, "Siba wenhua yanjiu," 90, 94; and GPI (Gansu Provincial Institute of Cultural Relics and Archaeology, and Jilin University), *Minle Donghuishan Kaogu: Siba wenhua mudi de jieshi yu yanjiu* (Excavation Report of the Donghuishan Site in Minle – Excavation and Study on the Siba Culture Cemetery) (Beijing: Kexue, 1998), 133. Also cf. Fitzgerald-Huber, Review of Debaine-Francfort, 267–68. The Tianshanbeilu cemetery is also called the 'Lin-ya cemetery' in some publications. To my knowledge, no radiocarbon dates have yet been published for it, but its ceramic vessels show many similarities in type and in painted design with those of the Siba culture, thus suggesting the date is close to that of the Siba. See Lü et al., "Xinjiang qingtong shidai kaogu wenhua qianlun," 184; and Li Shuicheng, "The interaction between Northwest China and Central Asia during the second millennium BC," 175–9.

²⁹ Li Shuicheng and Shui Tao, "Siba wenhua tongqi yanjiu (A study of the copper and bronze objects of the Siba culture)," *WW* 2000.3, 36–43.

³⁰ Li Shuicheng, "Siba wenhua yanjiu," 105.

³¹ Mei Jianjun, *Copper and Bronze Metallurgy in Late Prehistoric Xinjiang*, 11; Lü Enguo et al., "Xinjiang qingtong shidai kaogu wenhua qianlun," Qian Wei et al., "Xinjiang Hami Tianshanbeilu mudi chutu tongqi."

mainly of small implements, ornaments and weapons, such as knives, sickles, awls, axes, tubes, earrings, bracelets, mirrors, beads, buckles, plaques, daggers and arrow-heads (Figs. 5; 6). The typological connections with Eurasian steppe cultures, as well as with the Siba and Qijia cultures, can be seen in the cases of ring-pommeled knives with curved backs, knives with two protrusions on the back (Tianshanbeilu, Qijia), socketed axes, daggers, sickles, mirrors with or without decoration on the backs, ring-shaped earrings, buttons, and awls with bone handles (Figs. 2–6).³²

Furthermore, scientific analysis has offered additional supporting evidence for cultural connections between Northwest China and the Eurasian steppe. Recent scientific examinations have revealed that the Siba and Tianshanbeilu metal objects are largely made of two major alloys: namely tin bronze and arsenical copper (or bronze).³³ The materials for the Qijia metal artefacts, according to the analysis carried out during the late 1970s and early 1980s, are mainly pure copper and tin bronze.³⁴ However, a recent laboratory study seems to show the existence of arsenical copper among the Qijia metal objects too.³⁵ The identification of arsenical copper and tin bronze among early metal objects from Northwest China points to connections with areas further to the west and north in the Eurasian steppe. This is because the Urals on the middle Eurasian steppe was a center for the manufacture and use of arsenical copper around the beginning of the second millennium BC, while the use of tin bronze dominated the Altai and eastern Kazakhstan at the same time. According to Chernykh,³⁶ among the 353 Seima-Turbino metal objects analysed, 169 are tin bronze (47%) and 125 arsenical copper (36%), with the rest being pure copper, gold, silver, and copper-silver alloy. In distribution, metal objects found in Siberia are mostly tin bronzes, with a small number of arsenical coppers, while those found in the Urals and the areas to the west are predominantly objects of arsenical copper, with tin bronzes being less than 30%. It has been suggested that an eastward spread of arsenical copper from the Urals could have resulted in the appearance of arsenical copper in Siberia and Kazakhstan during the early part of the second millennium BC.³⁷ Whether the appearance and early use of arsenical copper in Northwest China could be linked with such an eastward spread of arsenical copper from the Urals is an issue that calls for serious consideration.³⁸

Therefore, in the light of recent archaeological and archaeo-metallurgical evidence from western Gansu and eastern Xinjiang, the argument for contacts between

³² Typological connections among the finds of painted pottery from Tianshanbeilu, Siba and Qijia are briefly discussed in Mei Jianjun, "Cultural interaction between China and Central Asia during the Bronze Age," *Proceedings of the British Academy*, 121 (2003), 16. For a fuller account of cultural interaction between eastern Xinjiang and Gansu-Qinghai during the Bronze Age, see Shui Tao, "Xinjiang qingtong shidai zhu wenhua de bijiao yanjiu," 465–9; Mei Jianjun, *Copper and Bronze Metallurgy in Late Prehistoric Xinjiang*, 61–65; and Li Shuicheng, 2002a, "The interaction between Northwest China and Central Asia during the second millennium BC," 175–9.

³³ Sun & Han, "Gansu zaoqi tongqi;" Mei Jianjun, *Copper and Bronze Metallurgy in Late Prehistoric Xinjiang*, 38–39; QianWei et al., "Gudai shentong yanjiu zongshu (A review of the studies of ancient arsenical copper)," *Wenwu Baohu yu Kaogu Kexue* (Sciences of Conservation and Archaeology), 12.2 (2000), 43–50; QianWei et al., "Xinjiang Hami Tianshanbeilu mudi chutu tongqi de chubu yanjiu."

³⁴ Sun & Han, "Zhongguo zaoqi tongqi de chubu yanjiu."

³⁵ Qian Wei et al., "Copper-arsenic alloys in ancient China." In Kim et al., *BUMA-V: Message from the History of Metals to the Future Metal Age* (Seoul: The Korean Institute of Metals and Materials, 2002), 235–42.

³⁶ Chernykh, *Ancient Metallurgy in the USSR*, 201–23.

³⁷ Chernykh, *Ancient Metallurgy in the USSR*, 222–33.

³⁸ Mei Jianjun, "Guanyu Zhongguo yejin qiyuan ji zaoqi tongqi yanjiu," 59–61.

Qijia and Seima-Turbino through a number of intermediaries seems to be tenable. The Siba sites and the Tianshanbeilu cemetery could have acted as such intermediary links between Qijia and Seima-Turbino in the early part of the second millennium BC.³⁹ Such recognition of the existence of cultural contacts between Northwest China and the Eurasian steppe undoubtedly offers us a new perspective, from which we are now able to seriously discuss steppe influence on the early development of copper and bronze metallurgy in Northwest China.

The Nature and Patterns of Early Contacts

The picture we have been able to draw so far is still somewhat vague and incomplete, and there remain many questions regarding the nature and patterns of early contacts between Northwest China (specifically Gansu, Qinghai and eastern Xinjiang) and the Eurasian steppe. First of all, the lack of solid archaeological evidence for contacts between the two regions during the third millennium BC makes it difficult to draw an indisputable conclusion regarding the origins of copper and bronze metallurgy in Northwest China. In fact, while observing the evidence for early links with the Eurasian steppe, some scholars still argue for an indigenous origin of bronze metallurgy in the Gansu region.⁴⁰ The major reasons for such an argument are the discoveries of four copper and bronze items of the Majiayao and Machang cultures in Gansu, dating to the early and late third millennium BC respectively. Besides, the westward spread of painted pottery from Gansu into Xinjiang and rich resources of non-ferrous metals in the Hexi Corridor in Gansu seem to provide further support for the view favouring an indigenous or local origin. By contrast, the fact that no metals have been found so far in Xinjiang earlier than 2000 BC makes it hardly convincing to ascribe a western impetus for the beginnings of copper and bronze metallurgy in the Gansu region.

However, in my opinion, we need to take a long-term and broad view on the early contacts between Northwest China and the Eurasian steppe. Serious studies of the issue have just begun, and encountering a situation of insufficient archaeological evidence is unavoidable. If we look at Northwest China from a wider perspective of early Eurasian interaction, we can notice that the use of copper and bronze in the Eurasian steppe is not just earlier but also more common than that in Northwest China. In southern Siberia, the earliest metal-using culture known so far is the Afanasevo, dating to the early and mid-third millennium BC.⁴¹ It bears a strong resemblance in burial rites and pottery forms to the Yamnaya (Pit-grave) culture of Eastern

³⁹ Given the fact that the archaeological information available for western Mongolia is still extremely limited, it would be too early to exclude another possible route suggested by Fitzgerald-Huber ("Qijia and Erlitou," 51) that may have led south along the Mongolian Altai and eventually have followed the Edsingingol to the Gansu Corridor.

⁴⁰ Qian Wei, et al. "Xinjiang Hami Tianshanbeilu mudi chutu tongqi," 88.

⁴¹ James P. Mallory, *In Search of the Indo-Europeans: Language, Archaeology and Myth* (London: Thames & Hudson, 1989), 223–25.

Europe (Chernykh 1992: 183).⁴² The Afanasevo people already had a certain degree of knowledge of metal-working, as evidenced by a small number of finds of metals made of pure copper, gold and silver.⁴³ After the Afanasevo culture, another major metal-using culture, the Okunev, emerged during the late third and early second millennia BC.⁴⁴ Much more evidence for the use of metals has been found from the Okunev sites, such as the finds of bone-handled awls and knives, rings, hooks, dagger-shaped knives and socketed spearheads which are the earliest pieces known so far in Siberia (Fig. 7). The majority of the Okunev metal objects are made of tin bronze, showing a similarity to the Seima-Turbino complex, but distinct from the Afanasevo culture, whose metal objects are mainly made of pure copper.⁴⁵

Was the Afanasevo culture in contact in some way with the early cultures in North-west China? This question cannot be fully answered at the present stage due to the lack of sufficient concrete evidence. But there are some signs suggesting the possibility. Based on his examination of the eighteen skulls excavated from the Gumugou burials in the Tarim basin, southern Xinjiang, Han Kangxin⁴⁶ suggests that the Gumugou people were probably pastoral migrants from southern Siberia who could be associated with the Afanasevo and Andronovo cultures. Kuzmina⁴⁷ also observes close parallels between Gumugou and Afanasevo in many cultural aspects, such as burial surface markings, the extended position of the skeleton, the use of pure copper, and fauna. Therefore, while the nature of the Gumugou-Afanasevo connection is far from clear due to the complete absence of ceramics in the Gumugou burials, the existence of some contact between Xinjiang and southern Siberia during

⁴² According to Elena E. Kuzmina, "Cultural connections of the Tarim Basin people and the pastoralists of the Asian steppe in the Bronze Age," in Victor Mair, ed., *The Bronze Age and Early Iron Age Peoples of Eastern Central Asia* (Washington: Institute for the Study of Man, 1998), 70–71, G. Debetz put forward a hypothesis as early as 1948 that the Afanasevo culture migrated from the west. The theory was supported by S. Kiselev and others, since the Afanasevo culture does not find its sources in Neolithic Siberia while the anthropological type and many features of burial rites, utensils, and peculiarities of pottery have correspondences in the Yamnaya culture. In the opinion of Mallory (*In Search of the Indo-Europeans*, 225–26), the Afanasevo culture originated somewhere to the west and can be seen as an extension of the Yamnaya culture from the Pontic-Caspian region eastwards to the Yenisey by about 3000 BC. Also cf. David W. Anthony, "The opening of the Eurasian steppe at 2000 BCE," in Victor Mair, ed. *The Bronze Age and Early Iron Age Peoples of Eastern Central Asia* (Washington: Institute for the Study of Man, 1998, Vol. 1), 104–105, and Fitzgerald-Huber, "Qijia and Erlitou," 28, note 25.

⁴³ Chernykh (*Ancient Metallurgy in the USSR*, 86–88) suggests that the stray find of a Yamnaya-type shaft-hole axe of bronze from the Altai can be included in the metal assemblage of the Afanasevo culture.

⁴⁴ Chernykh, *Ancient Metallurgy in the USSR*, 183–85.

⁴⁵ It should be noted that in contrast to the Afanasevo people being classified as Europoids, Russian anthropologists consider the Okunev people as Mongoloid of the Central Asian type (Mallory, *In Search of the Indo-Europeans*, 225, and Esther Jacobson, *The Deer Goddess of Ancient Siberia: A Study in the Ecology of Belief* [Leiden: E.J. Brill, 1993], 15). While the Okunev culture may be considered to be contemporary with or slightly earlier than the Seima-Turbino complex, crucial issues regarding their relationship remain unclear. It is hoped that ongoing archaeological excavations in Siberia will shed some light on them.

⁴⁶ Han Kangxin, "Xinjiang Kongquhe Gumugou mudi rengu yanjiu (Anthropological characteristics of the human skulls from the ancient cemetery at Gumugou, Xinjiang)," *KGXB* 1986.3, 371–73.

⁴⁷ Kuzmina, "Cultural connections of the Tarim Basin people and the pastoralists of the Asian steppe in the Bronze Age," 69–72.

the beginning of the second millennium BC or even earlier seems quite probable.⁴⁸ On the other hand, the finds of Machang pottery and copper objects in the Jiuquan region indicate that the Machang culture already extended from eastern Gansu to the western part of the Hexi Corridor by the second half of the third millennium BC.⁴⁹ There are even some signs from the Tianshanbeilu cemetery in Hami, eastern Xinjiang suggesting that the Machang culture could have spread further westward into eastern Xinjiang.⁵⁰ In this case, there would appear to be a possibility for contacts between Machang and Afanasevo in eastern Xinjiang in the later third millennium BC. Further evidence and research are needed for clarifying such speculation.

With regard to the Okunev culture, there is some evidence suggesting its possible links with early bronze cultures in Northwest China. Roughly speaking, it is contemporary with the Qijia, Siba and Tianshanbeilu cultures. Its repertoire of metalwork is also quite comparable in types to those found from the sites of Qijia, Siba and Tianshanbeilu, such as bone-handled awl, spearhead, ring and knife. Therefore, like the Seima-Turbino transcultural phenomenon, the Okunev culture could have also been in contact with the early bronze cultures in Northwest China, though the intermediate links for such contact require further evidence to be explicated.⁵¹

The significant existence of Andronovo cultural influence, or more precisely the Andronovo culture itself, in northwestern Xinjiang has already been noted by a number of scholars.⁵² The eastward spread of Andronovo influence into eastern Xinjiang and further east during the second millennium BC has also been argued on the basis of the typological and metallurgical evidence, such as the earrings with trumpet-shaped or flared ends from the Siba sites and the common use of tin bronze in eastern Xinjiang.⁵³ Therefore, the early contacts between Northwest China and the Eurasian steppe appear to consist of a number of independent processes carried out during different periods and through various routes and intermediary links, involving not just Seima-Turbino and Qijia, but also other cultural groups associated with Okunev, Andronovo, Siba, Tianshanbeilu, and possibly Afanasevo and Machang. In

⁴⁸ Other evidence for supporting Xinjiang-Afanasevo contact is given in Mei Jianjun, *Copper and Bronze Metallurgy in Late Prehistoric Xinjiang*, 58–59. Also see the discussions in Li Shuicheng, "The interaction between Northwest China and Central Asia during the second millennium BC," 178–9; and Lin Meicun, "Tuhuoluo ren de qiyuan yu qianxi (The origins and migrations of the Tocharians)," *XJWW* 2002.3/4, 73–76. However, according to James P. Mallory and Victor H. Mair, *The Tarim Mummies: Ancient China and the Mystery of the Earliest Peoples from the West* (London: Thames & Hudson, 2000), 244, the biological evidence currently available does not support the assumption that the Gumugou people stemmed from a migration of Caucasoid steppe populations.

⁴⁹ Li Shuicheng, "Hexi diqu xinjian Majiayao wenhua yicun ji xiangguan wenti," 132.

⁵⁰ Shui Tao, "Xinjiang qingtong shidai zhu wenhua de bijiao yanjiu," 467–68; Li Shuicheng, "The interaction between Northwest China and Central Asia during the second millennium BC," 36. As mentioned earlier in this paper, Andersson (in his "Researches into the prehistory of the Chinese," 278–80) observed the similarity between the painted pottery from Xinjiang and that of Machang a long time ago.

⁵¹ Lin Meicun ("Tuhuoluo ren de qiyuan yu qianxi," 77) suggests that some cultural elements seen at the Tianshanbeilu cemetery may have originated from the Okunev culture and the Sintashta-Petrovka culture.

⁵² Peng Ke, "The Andronovo bronze artifacts discovered in Gongliu county in Yili, Xinjiang," in Victor Mair, ed., *The Bronze Age and Early Iron Age Peoples of Eastern Central Asia* (Washington: Institute for the Study of Man, 1998), 573–80; Kuzmina, "Cultural connections of the Tarim Basin people and the pastoralists of the Asian steppe in the Bronze Age;" Mei Jianjun and Colin Shell, "The existence of Andronovo cultural influence in Xinjiang during the second millennium BC," *Antiquity* 73.281 (1999), 570–8; Debaine-Francfort, "Xinjiang and Northwestern China around 1000 BC."

⁵³ Mei & Shell, "The existence of Andronovo cultural influence in Xinjiang during the second millennium BC;" Mei, *Copper and Bronze Metallurgy in Late Prehistoric Xinjiang*, 59–61.

other words, what we are seeing in the relationship between Northwest China and the Eurasian steppe is a complex pattern of interregional interactions, rather than a simple process of one-way diffusion.⁵⁴ At least, as currently available archaeological evidence has revealed, interregional interactions among Tianshanbeilu, Siba and Qijia appear to be characterized by a series of two-way traffic along the Hexi Corridor, with painted pottery spreading westward and bronze technologies being transmitted eastward.⁵⁵ In some sense, eastern Xinjiang may have functioned as an early frontier between the East and the West, where cultural elements from various sources would have encountered and integrated into a new culture as seen in the finds from the Tianshanbeilu cemetery.

The co-existence of various steppe elements of different sources among the early bronze cultures in Northwest China suggests that the contacts would most likely be, by their nature, indirect, occasional, and small scale rather than in the form of massive migration. From the knives with curved back and a ring-shaped handle, knives with a bone handle, daggers, socketed spearheads and celts, we see cultural influence from the Seima-Turbino complex. Similarly, the awls with a bone handle, rings and dagger-shaped knives point to Okunev influence, while earrings with trumpet-shaped or flared ends, sickles, flat axes, awls and axes with an open socket suggest some associations with the eastward penetration of Andronovo cultural influence.⁵⁶

⁵⁴ Fitzgerald-Huber ("Qijia and Erlitou," 66) has expressed a similar opinion in the following statement: "Should it eventually be established that objects of metal were conveyed at this early date to the borderlands of present-day China, not only by groups associated with the Seima-Turbino of southern Siberia, but also from the Bactria-Margiana region by others affiliated with the Andronovo, then the history of long-distance cultural transmission across Eurasia during the first half of the second millennium will be revealed to have been a matter of greater complexity than might initially have been contemplated." It should be noted that she puts a great emphasis on the importance of cultural links with the Bactria-Margiana region, which is still poorly understood, due to the lack of adequate archaeological evidence.

⁵⁵ Mei Jianjun, *Copper and Bronze Metallurgy in Late Prehistoric Xinjiang*, 65–66. Debaine-Francfort ("Xinjiang and Northwestern China around 1000 BC," 67) also considers "painted ceramics" and "steppe metallurgy" as two traditions that characterize early cultures in northwestern China. Her observation is worth citing in full here: "While northern Xinjiang belongs to the steppe, the distribution of the painted pottery horizons corresponds with that of the oasis cultures, where several distinctive traditions locally coexist and superimpose: on the one hand, painted ceramics of an eastern (Chinese) origin and, on the other, what we can broadly call 'steppe metallurgy' belonging to 'the Eurasian Metallurgical Province.' These two traditions appear and evolve, each according to its own dynamics and on a different scale, a situation likewise observable in contemporaneous cultures in northwestern China (Gansu-Qinghai provinces)."

⁵⁶ As suggested by Fitzgerald-Huber ("Qijia and Erlitou," 52–59), some connections probably through the Andronovo cultural groups with the Bactria and Margiana region in western Central Asia may require serious consideration too. The earliest use of wheat, barley, mud-bricks, bronze mirrors and macehead in Northwest China could be related to some influence at different periods from that region. The macehead decorated with four protruding goat heads from the Huoshaogou site of the Siba culture is of special interests. It is comparable in type and design to those found in Bactrian and Iranian regions, one piece in bronze being exhibited at the Sackler Museum of Harvard University. For published information of maceheads and objects with similar decoration from Bactria, see Marie-Hélène Pottier, *Matériel Funéraire de la Bactriane Méridionale de L'âge du Bronze* (Paris: Editions Recherche sur les Civilisations, 1984), 143, 190, 200; V.I. Sarianidi, *Drevnie Zemledeltsy Afganistana* (Ancient Farmers in Afganistan) (Moscow: Nauka, 1977), 82; also cf. Debaine-Francfort, "Xinjiang and Northwestern China around 1000 BC," 63; and Emma C. Bunker, "Cultural diversity in the Tarim basin vicinity and its impact on ancient Chinese culture," in Victor Mair, ed. *The Bronze Age and Early Iron Age Peoples of Eastern Central Asia* (Washington: Institute for the Study of Man, 1998), Vol. 1, 604–18. But one should be aware that the intermediary links between the Hexi Corridor and western Central Asia and the further west are still lacking, and this situation prevents us from any concrete reconstruction of the suggested connections. I am most grateful to Drs. Nikolaus Boroffka and Louisa Fitzgerald-Huber for sharing with me their knowledge and opinions of mirror and macehead finds in Central Asia and Northwest China.

The sporadic and indirect nature of these connections and the complex patterns of interaction processes through various intermediary links would help to explain why some typical steppe metal objects seem to be conspicuously absent in Northwest China, such as socketed celts decorated with geometric patterns, knives and daggers with handles shaped in animal design (Seima-Turbino), and shaft-hole axes (Andronovo). Clearly those separate intermediaries could have played a notable role in shaping the patterns of transmission of raw materials, products and ideas between Northwest China and the Eurasian steppe.

The Local Innovations in Northwest China

While the argument for early contacts between Northwest China and the Eurasian steppe has become increasingly plausible and strong, we should also be aware that among the early metal objects found in Northwest China, some exhibit characteristic local features in typology and metallurgical technology. For example, the plaques from Tianshanbeilu (Figs. 5: 1, 34; 6: 23), the knives with two protrusions on the back from Tianshanbeilu and Qijia (Figs. 5: 2; 2: 6), and the mirrors decorated with geometric patterns on the back from Qijia and Tianshanbeilu (Figs. 2: 9; 5: 29), are all extraordinary finds that appear to have had no contemporary parallels in the Eurasian steppe as far as presently available archaeological data is concerned. Plain mirrors are also seen among the finds from the Qijia, Siba and Tianshanbeilu sites. In contrast, the Okunev and Seima-Turbino sites have not yet yielded mirrors, and only a few pieces of plain mirrors rather than decorated ones have been recovered from the Andronovo sites.⁵⁷ It is extremely unclear whether the Andronovo mirrors had any connections with those specimens discovered in Northwest China. Whatever the case may be, the finds of several decorated mirrors of such early date in Northwest China are indeed extraordinary and it may be reasonable to suggest that they have actually resulted from local technological innovations.⁵⁸ Other objects that would be better understood from the perspective of local innovations include a Qijia knife, the pommel of which is decorated with an unusual human face, as well as the large Qijia

⁵⁷ Kuzmina, "Cultural connections of the Tarim Basin people and the pastoralists of the Asian steppe in the Bronze Age," 79–80.

⁵⁸ Fitzgerald-Huber ("Qijia and Erlitou," 53–59), however, sees that the 'star' design on the back of the Gamatai mirror points to a derivation reaching ultimately as far away as the areas of southern Turkmenistan and Bactria. It seems that circular mirror became a common type of steppe or northern metalwork only from the late second millennium BC. Circular mirrors with and without handles of the third millennium BC have been found only in Iran and Afghanistan, but not in the Eurasian steppe, suggesting the origins of the circular mirrors should be traced in western Central Asia or West Asia rather than in the Eurasian steppe. For mirror finds of the third and second millennium BC in western Central Asia and further west, see Sarianidi, *Drevnie Zemledeltsy Afganistana*, 81, figure 64; *Nekropol Gonura I Iranskoe Yachestvo* (Necropolis of Gonur and Iranian Paganism) (Moscow, 2001), 161, 193; Pottier, *Matériel Funéraire de la Bactriane Méridionale de L'âge du Bronze*, 172–3, 214; Ali Hakemi, *Shahdad: Archaeological Excavations of a Bronze Age Center in Iran* (Rome: IsMEO, 1997), 63, 168, 206, 654. Some Chinese scholars argue that copper and bronze mirrors originated in the regions of Gansu and Qinghai, then spread eastwards to North and Central China and westwards to eastern Xinjiang (Song Xinchao, "Zhongguo zaoqi tongjing jiqi xiangguan wenti [Early copper and bronze mirrors and the relevant issues]," *KGXB* 1997.2, 161–3), while others would prefer to see Xinjiang as an origin of the use of circular metal mirrors (Liu Xuetao, "Xinjiang diqu zaoqi tongjing ji xiangguan wenti [Early bronze mirrors in the Xinjiang region and the relevant issues]," *XJWW* 1993.1, 128–9). For a brief review of the debate on the beginnings and early use of metal mirrors, see Mei Jianjun, *Copper and Bronze Metallurgy in Late Prehistoric Xinjiang*, 32–35.

spearhead from the Shenna site in Xining, because their design and form carry some local 'flavour'.⁵⁹ Even the macehead excavated from the Huoshaogou cemetery of the Siba culture, according to the observation of Barnard,⁶⁰ is cast by using the piece-mould technique, which could also point to some local innovation inspired by influence from the Central Plains of China (Sun & Han 1997: 82). But the most direct evidence for the existence of local metallurgical activities is the find of stone casting moulds for sickles and arrowheads discovered at the Huoshaogou cemetery in the Hexi Corridor region.⁶¹ Although the evidence is still sparse, the existence of local innovations in Northwest China seems quite probable. In this case, some further questions arise: what was the driving force behind these innovations? Could they have been motivated by the elites' desire for some symbolized expression of their status and power? What relationship was there between local innovations and outside influences? Obviously, to answer these questions, we need to investigate social and economic changes during the period concerned at a regional level. The role of interregional interaction in such changes should also be examined with a focus on the relationships among Qijia, Siba and Tianshanbeilu.

From the point of view of metallurgical technology, the early metal objects found in Northwest China have also shown some features distinguishable from those seen in the Eurasian steppe. For examples, among the metal objects from the Huoshaogou cemetery of the Siba culture, there are a group of objects made of leaded bronzes or leaded tin-bronzes.⁶² In contrast, leaded copper alloys dating to the same period as Siba have only rarely been found so far in the Eurasian steppe. Some scholars suggest that the appearance and co-existence of various copper alloys (such as tin bronze, arsenical copper, and leaded bronze) in the Hexi Corridor in Gansu could be related to the availability of local mineral resources.⁶³ Up to now, however, no actual evidence for early copper mining in the region has yet become available to confirm this suggestion. Further research along this line is essential for understanding the emergence of metallurgical diversity in the region.

The early use of arsenical copper in Northwest China also presents a complex picture, which cannot be fully explained by cultural transmission or outside influence. According to Chernykh,⁶⁴ arsenical copper could represent a metallurgical tradition commonly practiced in the central and west parts of the Eurasian steppe (the Urals mountains and further west) during the late third and early second millennia

⁵⁹ The face design on the Qijia knife is generally consistent with a well-established decorative tradition widely seen among early local ceramics. See Gansu Museum, *Sichou zhi lu Gansu Wenwu Jinghua*, figs. 7, 11, 12 and QIA (Qinghai Institute of Archaeology). *Qinghai Wenwu* (Cultural Relics from Qinghai). (Beijing: Wenwu, 1994), figs. 30, 36, 43, for some ceramic examples with face decoration in Gansu and Qinghai. The spearheads with a relatively wide body and a blunt end have also been recovered in the Shaanxi and Shanxi provinces of North China. For more information, see Mei Jianjun, "Cultural interaction between China and Central Asia during the Bronze Age," 7–11.

⁶⁰ Noel Barnard, "Thoughts on the emergence of metallurgy in pre-Shang and early Shang China, and a technical appraisal of relevant bronze artifacts of the time." *BMM* 19 (1993), 12.

⁶¹ Sun & Han, "Zhongguo zaoqi tongqi de chubu yanjiu," 289.

⁶² Sun & Han, "Gansu zaoqi tongqi," 80.

⁶³ Sun & Han, "Gansu zaoqi tongqi," 83; Li & Shui, "Siba wenhua tongqi yanjiu," 42.

⁶⁴ Chernykh, *Ancient Metallurgy in the USSR*, 222–33.

BC, while tin bronze seemed to have predominated in southern Siberia, the Altai and eastern Kazakhstan, as shown by the analyses of the metals of Okunev, Seima-Turbino and Andronovo. Therefore, if we consider that the appearance of arsenical copper in Northwest China resulted from steppe influence, then such transmission must have involved many intermediate links, stage by stage, especially in the Altai region in northern Xinjiang. Unfortunately, archaeological work in the Altai region has been very limited so far and we have no idea whether arsenical copper was employed there around 2000 BC.⁶⁵ Furthermore, as shown by the metallurgical analyses of the metal objects from Wupu and Yanbulake, Nanwan and Heigouliang, the use of arsenical copper in eastern Xinjiang could have lasted a long time, from the early second to the first millennia BC.⁶⁶ This fact would strongly support the idea of local production instead of outside imports. In fact, metallurgical study of the Nulasai copper mining and smelting site in Yili, western Xinjiang, currently dated to the earlier half of the first millennium BC, has confirmed the local production of arsenical copper as well as leaded arsenical copper (Cu-As-Pb alloys) in northwestern Xinjiang.⁶⁷ But whether the Nulasai site was already in use during the second millennium BC and whether the metals produced at Nulasai were transported to and used in eastern Xinjiang cannot be determined because the research that has been done remains highly inadequate.⁶⁸ Further research with a focus on local mineral resources is necessary for clarifying the issue of material provenance in Northwest China during second millennium BC.

Conclusions

There is a growing body of evidence from Gansu, Qinghai and eastern Xinjiang suggesting that these regions were in contact with the Eurasian steppe during the late third and early second millennia BC. But there remain a number of questions regarding the nature and patterns of these early contacts. It has become increasingly clear that the early development of copper-based metallurgy in Northwest China may have received impetus from the Eurasian steppe, but whether such steppe influence played a role in the beginnings of metallurgy in Northwest China during the third millennium BC remains to be resolved. The pattern of the early contacts between Northwest China and the Eurasian steppe seems to be characterised by many inter-

⁶⁵ Another possibility that should be considered is the link with western Central Asia, where the use of arsenical copper were quite common during the late third and early second millennia BC (V.M. Masson et al., "Man at the dawn of civilization," in Philip L. Kohl, ed., *The Bronze Age Civilization of Central Asia: Recent Soviet Discoveries* [New York: M. E. Sharpe, 1981], 110; N.N. Terekhova, 1981. "The history of metalworking production among the ancient agriculturalists of Southern Turkmenia," in Philip L. Kohl, ed., *The Bronze Age Civilization of Central Asia: Recent Soviet Discoveries* [New York: M. E. Sharpe, 1981], 319). As mentioned earlier, the difficulty for tracing such link is the lacking of archaeological evidence of contemporary period from western part of Xinjiang.

⁶⁶ Mei Jianjun, *Copper and Bronze Metallurgy in Late Prehistoric Xinjiang*, 40; Qian Wei et al., "Gudai shentong yanjiu zongshu," 48.

⁶⁷ Mei Jianjun, *Copper and Bronze Metallurgy in Late Prehistoric Xinjiang*, 50–57.

⁶⁸ A metal button recovered from a site dated to around 1000 BC in Hami, eastern Xinjiang has been revealed to be made of leaded arsenical copper (Cu-As-Pb alloys), suggesting its possible connection with the Nulasai site (Mei Jianjun, *Copper and Bronze Metallurgy in Late Prehistoric Xinjiang*, 57).

mediate links, which may have acted as a filter, leading to the absence of some typical steppe metal objects in Northwest China. The regional and local features exhibited by early metals from Northwest China suggest that both interregional interaction and local innovations may have played a role in shaping the early development of bronze cultures in Northwest China.

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Abbreviations used:

- BMFEA *Bulletin of the Museum of Far Eastern Antiquities*
 BMM *Bulletin of the Metals Museum*
 KG *Kaogu* (Archaeology)
 KGXB *Kaogu xuebao* (Acta Archaeologia Sinica)
 TY *Tulufanxue Yanjiu* (Turfanological Research)
 WW *Wenwu* (Cultural Relics)
 XJWW *Xinjiang wenwu* (Cultural Relics in Xinjiang)

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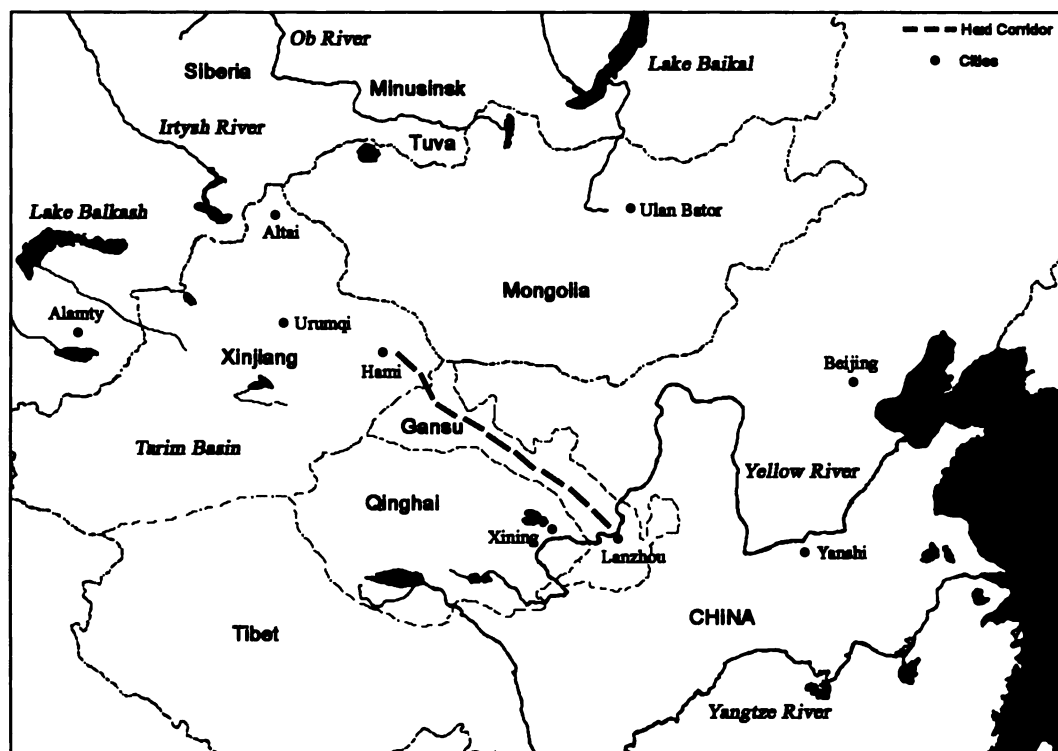


Figure 1. Map of Northwest China and the eastern part of Central Asia, showing the location of the Hexi Corridor.

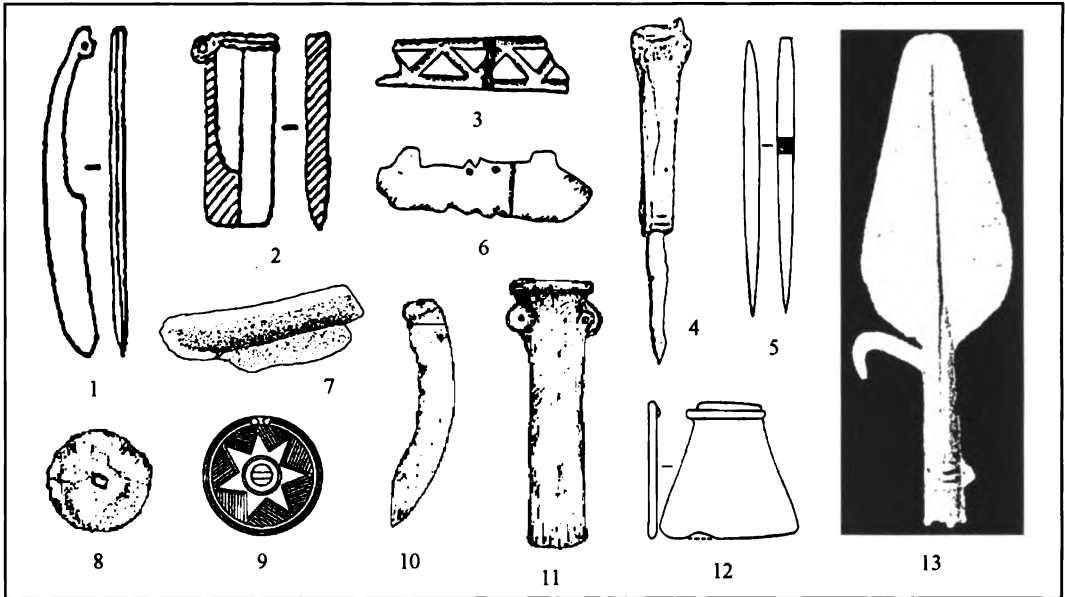


Figure 2. Copper and bronze artefacts recovered at various Qijia culture sites in Gansu and Qinghai: 1: knife; 2, 11: socketed axes or celts; 3: handle; 4, 7: knives with bone handles; 5: awl; 6: knife with two protrusions on the back; 8, 9: mirrors; 10: sickle; 12: flat axe; 13: spearhead (7: drawing after Tian 1983: 76, photo; 13: after Takahama 2000: 122, figure 3; the rest after Debaine-Francfort 1995: 86, figure 49; 104, figure 61; and 119, figure 71).

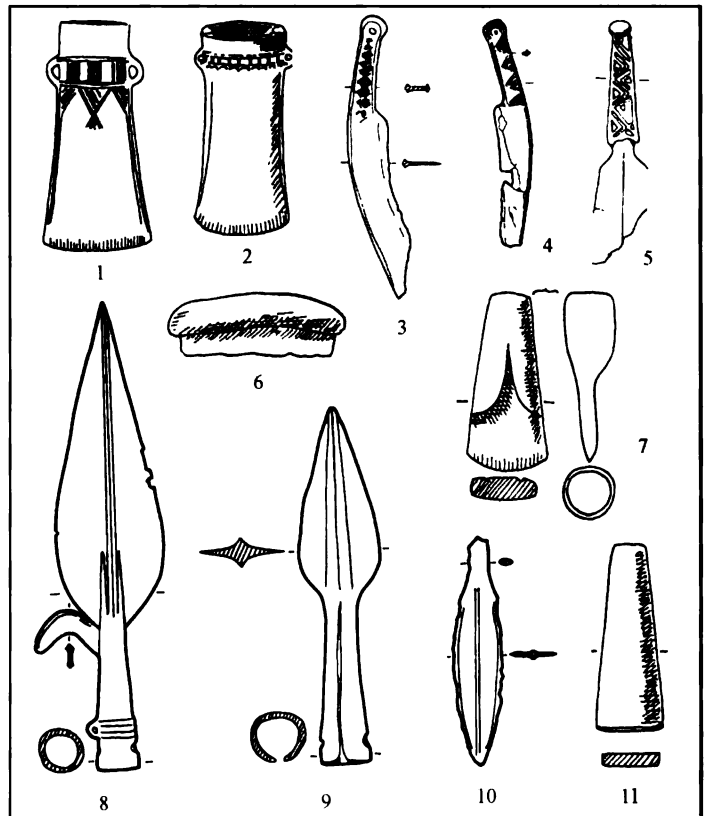


Figure 3.
Copper and bronze artefacts ascribed to the Seima-Turbino transcultural phenomenon:
1, 2, 7: socketed celts or axes;
3, 4: knives;
5, 10: daggers;
6: knife with a bone handle;
8, 9: socketed spearheads;
11: flat axe
(1, 2, 6, 7, 11: after Gimbutas 1956: 153, figure 9 and 160, figure 16;
3-5: after Fitzgerald-Huber 1995: 45, figure 8;
8-10: after Chernykh 1992: 221, figure 75).

Figure 4.
Copper and bronze artefacts of the Siba culture found in Gansu:
1–5: arrowheads;
6: ring;
7–8: buttons;
9–14: earrings and rings;
15–19: ornaments;
20–29: knives;
30–31: socketed axes;
32–33: awls;
34: macehead (after Bai 2002: 29, figure 3).

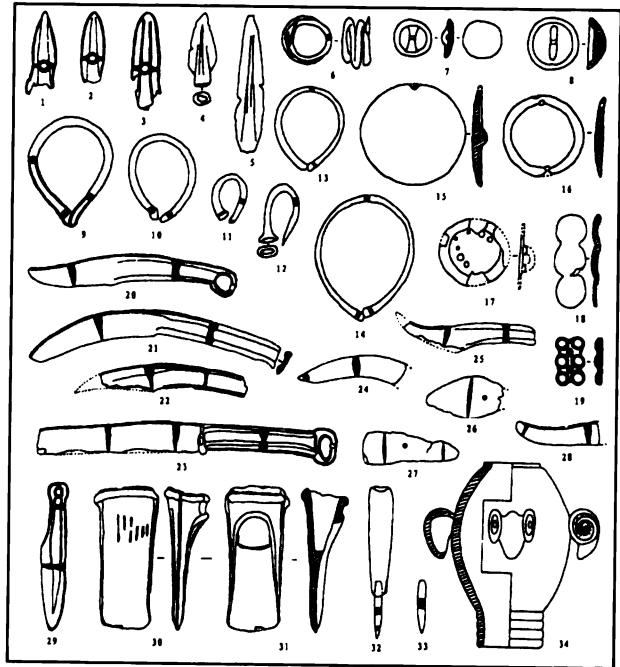
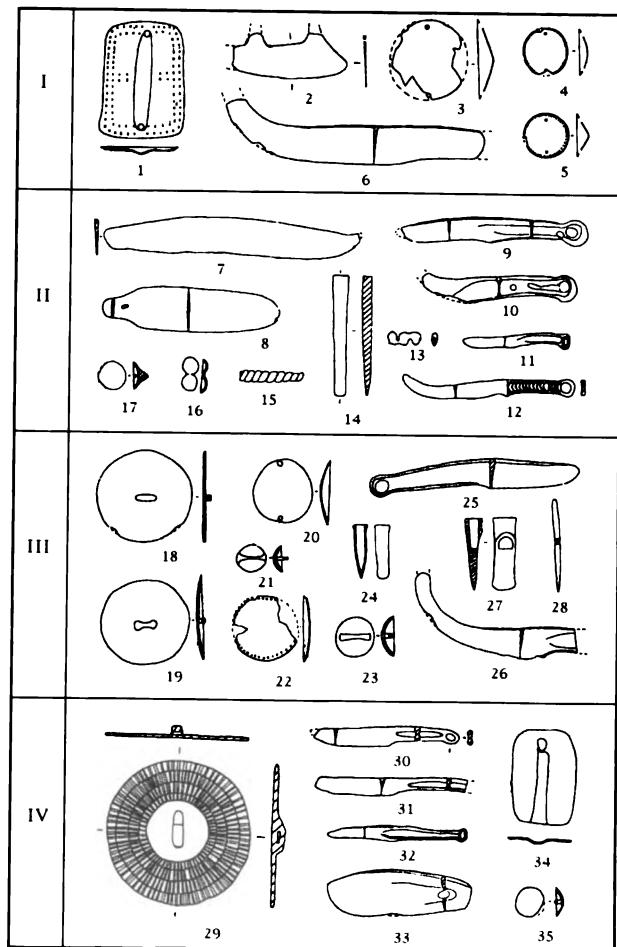


Figure 5.
Copper and bronze artifacts found at the Tianshanbeilu cemetery, Hami, Xinjiang (Periods I to IV in chronological order): 1, 3–5, 13, 15–23, 34, 35: plaques, buttons and other ornaments;
2, 6–12, 25, 26, 30–33: knives, sickles and knife-dagger;
14, 24, 27, 28: awls and axes;
29: mirror (after Lü, *et al.* 2001: 182–3, figures 15–18).



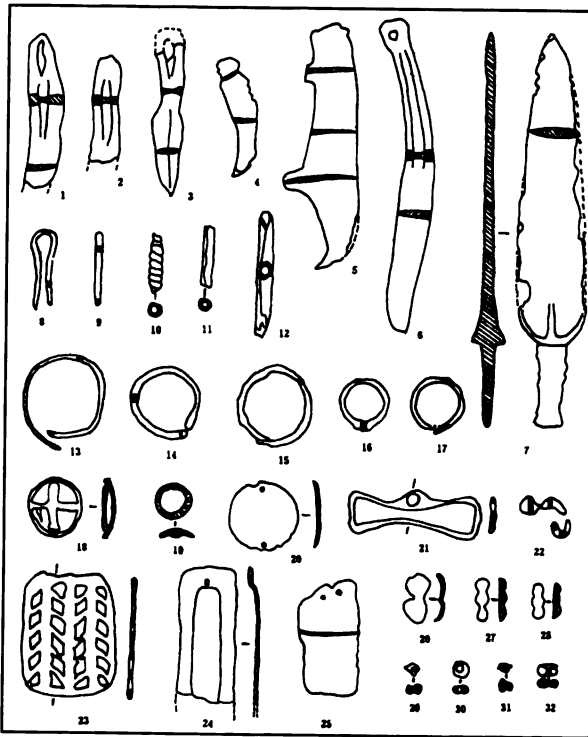


Figure 6.
Copper and bronze artifacts found at the Tianshanbeilu cemetery, Hami, Xinjiang: 1, 2, 4-6: knives; 3, 7: daggers; 8-32: rings, plaques, buttons, tubes and other small ornaments and implements (after Qian *et al.* 2001: 80, figure 1).

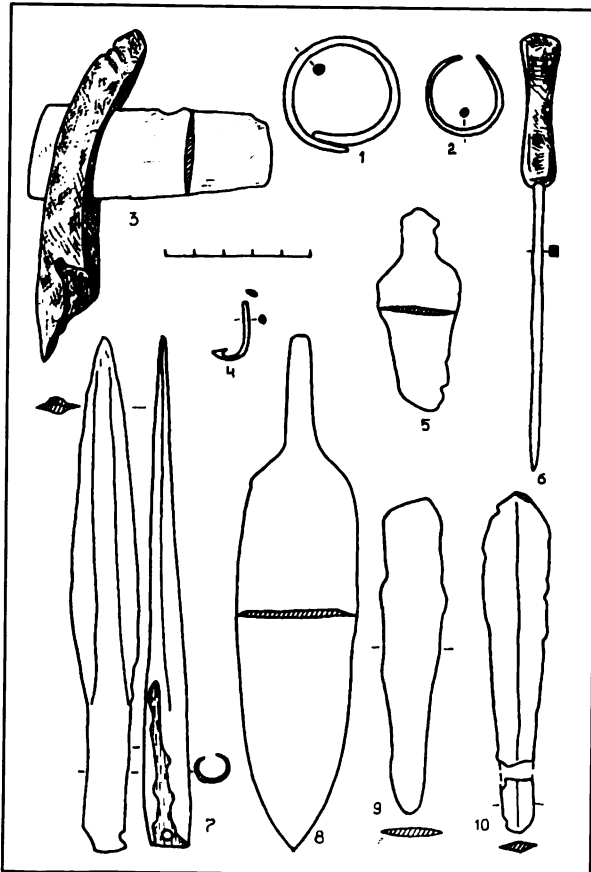


Figure 7.
Metal artifacts from Okunev culture sites in the Minusinsk basin, South Siberia: 1, 2: rings; 3: knife with a bone handle; 4: fish-hook; 5, 8-10: knives or dagger-knives; 6: awl with a bone handle; 7: socketed spearhead (after Chernykh 1992: 184, figure 65).

The Qijia Culture: Paths East and West

by

Louisa G. Fitzgerald-Huber

In the lengthy story of cultural exchange between central Eurasia and China, the Qijia culture has special importance because metal objects make their first appearance in the Chinese archaeological record within this context. The objects in question, modest implements and other small items made of hammered or cast copper, and more rarely of bronze, derive from earlier ones typical for Eurasian population groups across Western Central Asia and south Siberia, where metallurgy was already well-established.¹ Although metal objects are represented a short time later at sites in more westerly Xinjiang province and to the northeast in Inner Mongolia, it is the Qijia settlements in Gansu that evidently served as their initial point of entry.

The culture was discovered in 1924 by the Swedish geologist and archaeologist Johan Gunnar Andersson at the eponymous site of Qijiaping, located on a high terrace above the west bank of the Tao River not far from Lintao in central Gansu, and it was he who first described it.² From his observation that Qijia pottery only rarely bears painted decoration and that when it does, the motifs are typically of great simplicity, Andersson inferred that these wares predated the long tradition of more complexly decorated pottery identified in the course of his excavations at other sites.³

Andersson's hypothesis was first challenged by his graduate student Margit Bylin-Althin, who was assigned the task of publishing a complete report of the

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¹ Sun Shuyun and Han Rubin, "A Study of Casting and Manufacturing Techniques of Early Copper and Bronze Artifacts Found in Gansu," in Kathryn M. Linduff, Han Rubin and Sun Shuyun, eds., *The Beginnings of Metallurgy in China* (Lewiston: Edwin Mellon Press, 2000), 177–78; table 1, 179–81. Most of the Qijia metal objects are made of hammered copper. For studies on the Qijia metal implements and their possible Eurasian prototypes, see, Louisa Fitzgerald-Huber, "Qijia and Erlitou: The Question of Contacts with Distant Cultures," *Early China* 20 (1995), 38–52.

² Johan Gunnar Andersson, "Researches into the Prehistory of the Chinese," *Bulletin of the Museum of Far Eastern Antiquities* 15 (1943), 78–82.

³ Andersson, "Researches into the Prehistory of the Chinese," 82.

Qijiaping finds.⁴ Her insight that some Qijia ceramic pieces were obviously made "in imitation of metallic models" (Figure 13)⁵ changed forever the way Qijia was to be understood—no longer as one of the earliest Chinese neolithic cultures, but instead among the very latest. She held to this view fully aware of the "absence of metal in the excavated finds."⁶ Since then, the recovery of nearly fifty metal artifacts from the Qijia sites has substantiated Bylin-Althin's perception that this was indeed a metal age culture; but ironically the hypothetical sheet-metal vessels upon which she based her theory have continued to elude archaeologists to this day.

What we now know of the Qijia culture far surpasses anything Andersson and his colleagues could have foreseen. From the mere one or two find spots in central Gansu recognized by Andersson, the number of Qijia sites has grown to more than 450, stretching north into the Hexi Corridor, deep into neighboring Qinghai, and includes isolated locations as far away as Inner Mongolia. Over half a century of excavations has afforded information about its settlements, gravefields and its range of cultural properties, and radiocarbon analysis has provided a clear determination of its date (around 2000 B.C.).⁷

The accumulated data has generated a host of new questions about this culture. Among them is the issue of its origins, which remains far from settled despite much recent debate. The reasons for the apparent sudden florescence of this culture and its eventual widespread geographical distribution also need to be investigated, as does the issue of the relations between Qijia and the more urbanized and more highly evolved societies of Taosi and Erlitou to the east in southwestern Shanxi and western Henan. The present paper seeks to examine these several aspects of the cultural context in which influences from across Eurasia, and metallurgy in particular, were received.

What we call the Qijia culture, and what sets it apart from others, is based on a cluster of material remains exhibiting certain consistent hallmark characteristics that imply a way of life shared in large measure by the communities, however unidentifiable or inconstant as to the actual make-up of their population, that once inhabited the range of sites where these traits predominate.⁸ In the case of the Qijia, these traits include a specific ceramic repertoire, comprising a large amphora, or *hu*, with a tall neck, a sloping mantle and a cord-marked lower section; various one- and two-handled *guan* jars; and distinctive two- or three-handled beakers (*bei*), whose

⁴ Margit Bylin-Althin, "The Sites of Ch'i Chia P'ing and Lo Han T'ang in Kansu," *Bulletin of the Museum of Far Eastern Antiquities* 18 (1946), 383–498.

⁵ Bylin-Althin, "The Sites of Ch'i Chia P'ing and Lo Han T'ang in Kansu," 465; see also 426–27, 463, 465, 467.

⁶ Bylin-Althin, "The Sites of Ch'i Chia P'ing and Lo Han T'ang in Kansu," 466; 386, 426, 462–63.

⁷ A convenient table of the radiocarbon dates for the Qijia sites is provided by Corinne Debaine-Francfort, *Du Néolithique à l'Âge du Bronze en Chine du Nord-Ouest: La culture de Qijia et ses connexions* (Paris: Éditions Recherche sur les Civilisations, 1995), 361.

⁸ For discussions of the Qijia culture and its relative chronology, see Debaine-Francfort, *Du Néolithique à l'Âge du Bronze en Chine du Nord-Ouest*, 269–300; Fitzgerald-Huber, "Qijia and Erlitou," 37, note 53; Zhang Zhongpei, "Qijia wenhua yanjiu (I)," *Kaogu xuebao* 1987.1, 1–18; "Qijia wenhua yanjiu (II)," *Kaogu xuebao* 1987.2, 153–175; Liang Xingpeng, "Qijia wenhua qiyuan tantao," *Shiqian yanji* 1984.3, 32–40; Xie Duanju, "Shilun Qijia wenhua yu Shaanxi Longshan wenhua de guanxi," *Wenwu* 1979. 10, 60–68.

broad strap-handles arc between the rim and the mid-point of the vessel's lower section (Figure 1).⁹ The three-handled version of this vessel, which appears to be the earlier manifestation of this form, may indicate a practice of communal drinking in which the vessel is held by two hands and passed on to the next participant, who takes it by the third handle. Unlike the earlier Gansu ceramic traditions, the Qijia vessels are generally undecorated, although in some instances the bodies of the two-handled beakers are encircled by a row of nested triangles painted in red. Other ceramic forms such as the *tazza*, the *yan* and *li* vessels and some more elaborately painted *guan* appear at some sites and not at others and suggest regional affiliations, either with Machang or Kexingzhuang II.¹⁰ To the list of Qijia cultural properties must also be added the presence of ox scapula used in divination, pig mandibles, which often served as burial gifts, and the practice of double and triple burials, with the man in supine position and the female to his side facing him in a flexed position.¹¹ And, not least, small metal implements and ornaments are an integral part of the Qijia archaeological assemblage, as are disks, rings and knife blades fashioned from nephrite and other varieties of stone.¹²

Sources of the Qijia Culture and their Implications for its Later Development

But if the Qijia culture is readily recognizable by these diagnostic traits, there is much we do not know about this culture, and much that has been subject to varying and even opposing interpretation. What is perhaps the most problematic issue concerning the Qijia is the question of its origins. Various scholars, including Yan Wenming, have pointed to its close association with the Gansu Yangshao cultures, and in particular to Machang, and have tended to find its source there.¹³ Others such as Xie Duanju have proposed a more easterly origin for this culture in consideration of the evidence for its association with the Shaanxi-Longshan Kexingzhuang II culture.¹⁴

Hu Qianying, and in turn, Debaine-Francfort, unconvinced by both these alternatives, have instead called attention to a relatively inconspicuous cluster of

⁹ *Hu* occur at virtually all Qijia sites and become increasingly slender over time (compare Figure 1, left and Xie Duanju, "Gansu Yongjing Qinweijia wenhua mudi," *Kaogu xuebao* 1975.2, pl. 7).

¹⁰ The *tazza* is represented, for example, at Liuwan, Huangniangniangtai and Qinweijia (Qinghai sheng wenwu guanlichu kaogu dui, Zhongguo shehui kexueyuan kaogu yanjiusuo, *Qinghai Liuwan* [Beijing: Wenwu, 1984], vol. 2, pl. 198; Wei Huaiheng, "Wuwei Huangniangniangtai," pl. 10: 4; Xie Duanju, "Gansu Yongjing Qinweijia wenhua mudi," *Kaogu xuebao* 1975.2, pl. 8). *Xian* and *li* from Huangniangniangtai and Qinweijia are illustrated in Wei Huaiheng, "Wuwei Huangniangniangtai yizhi disici fajue," *Kaogu xuebao* 1978.4, 421–48, pl. 10: 2; and Xie Duanju, "Gansu Yongjing Qinweijia," pl. 11: 12; for *guan* with Machang-style painted decoration, see Wei Huaiheng, "Wuwei Huangniangniangtai," pl. 8: 3–5.

¹¹ Wei Huaiheng, "Wuwei Huangniangniangtai," pl. 2: 2–3 (M 52, M 48); Xie Duanju, "Gansu Yongjing Qinweijia," pl. 13: 1–3 (M 105, M 60, M 52).

¹² Debaine-Francfort, *Du Néolithique à l'Âge du Bronze en Chine du Nord-Ouest*, notes the presence of jade and stone disks at several Qijia sites (282), but she omits these items from her inventory of attributes most characteristic of the culture as a whole (299).

¹³ Yan Wenming "Gansu caitao de yuanliu," *Wenwu* 1978.10, 62–76.

¹⁴ Xie Duanju, "Shilun Qijia wenhua yu Shaanxi Longshan wenhua de guanxi," *Wenwu* 1979.10, 60–68. For a recent summary of various theories regarding the origins of Qijia, see Debaine-Francfort, *Du Néolithique à l'Âge du Bronze en Chine du Nord-Ouest*, 278–81.

sites, primarily the Changshan Lower settlements at Zhenyuan in eastern Gansu and others yielding the same type of ceramics in the neighboring area of Ningxia, including the Guyuan site of Dianhe and a few in the vicinity of Caiyuan.¹⁵ While Debaine-Francfort agrees with Hu Qianying that Changshan constitutes a potential proto-Qijia phase, she refrains from endorsing the proposal of this more easterly origin of the Qijia on account of what she perceives as an underlying affinity of the Qijia with an overall Gansu cultural continuum.¹⁶

If, on the other hand, we are able to rely on the single calibrated radiocarbon date for the Changshan finds of approximately 2900–2700 BCE,¹⁷ by far the earliest available date for any associated Qijia site, we are forced to take Changshan seriously as a potential point of origin for the Qijia culture itself. It is at Changshan, for the first time, that we encounter the entire range of diagnostic Qijia vessel forms: the three-handled beaker, the amphora with cord impressions below the mantle, and a variety of one- and two-handled *guan* (Figure 2). The same inventory of vessels, including importantly the one-handled jug, its surface embellished with vertical incisions, is repeated at Guyuan Dianhe and other Ningxia sites (Figure 3).¹⁸ The fact that one of the Dianhe graves (M 2) and another at Waguanzui (M 35) each contained a single Banshan painted vessel (Figure 3, right), indicating that these burials belong to the pre-Machang horizon in Gansu, further supports the early radiocarbon date for Changshan.¹⁹ The habit of flexed burials, frequent in Banshan cemeteries, is observable at Dianhe, although not at Changshan itself, and suggests an especially close, if so far unexplained, association between the Changshan and Banshan cultural groups.²⁰

During the same period, several typical Changshan pottery forms, including the cord-marked amphora, the cord-marked two-handled *guan* showing rows of dots impressed at the base of the neck, and a short, cylindrical two-handled beaker canted at the base, make their appearance farther to the east at the Baoji site of Laohugou and at Fufeng Anban III in the context of characteristic Miaodigou II ceramics, of a kind widely distributed throughout central Shaanxi in the early third millennium.²¹

¹⁵ Hu Qianying, "Shilun Qijia wenhua de butong leixing jiqi yuanliu," *Kaogu yu wenwu* 1980.3, 77–82.

¹⁶ Debaine-Francfort, *Du Néolithique à l'Âge du Bronze en Chine du Nord-Ouest*, 281, 295, 297, 299, 344; see also Fitzgerald-Huber, review article, *Early China* 22 (1997), 259–60.

¹⁷ Zhongguo shehui kexueyuan kaogu yanjiusuo, *Zhongguo kaoguxue zhong tanshi niandai shujuji* 1965–1991 (Beijing: Wenwu, 1992), 280.

¹⁸ Ningxia wenwu kaogu yanjiusuo, "Ningxia Guyuan Dianhe Qijia wenhua muzang qingli jianbao," *Kaogu* 1987.8, 673–77; Xu Cheng et al., "Ningxia Haiyuan xian Caiyuan yizhi mudi fajue jianbao," *Wenwu* 1988.9, 4, fig. 5: 14 (Liuzhiliang); p. 6, fig. 8: 3 (Waguanzui); Zhong Kan and Zhang Xinzhi, "Ningxia Xiji Xinglongzhen de Qijia wenhua yizhi," *Kaogu* 1964.5, pl. 4: 3 (Longde Shangqijia). The Ningxia sites are described in detail by Debaine-Francfort, *Du Néolithique à l'Âge du Bronze en Chine du Nord-Ouest*, 171–85.

¹⁹ Ningxia wenwu kaogu yanjiusuo, "Ningxia Guyuan Dianhe," pp. 675, fig. 6; pl. 1: 2; Xu Cheng and Liu Jinzeng, "Haiyuan xian Waguanzui xinshiqi shidai mudi," in *Zhongguo kaogu xue nian jian* 1988 (Beijing: Wenwu, 1989), p. 5, fig. 7. Debaine-Francfort observes (*Du Néolithique à l'Âge du Bronze en Chine du Nord-Ouest*, 296) that small rectangular bone plaques with serrate edges found at Dianhe also occur in the Banshan burials at Ledu Liuwang (compare Qinghai sheng wenwu guanlichu kaogu dui, Zhongguo shehui kexueyuan kaogu yanjiusuo, *Qinghai Liuwang*, vol. 1, 50, fig. 36: 20–21; vol. 2, pl. 37).

²⁰ Ningxia wenwu kaogu yanjiusuo, "Ningxia Guyuan Dianhe," 673, figs. 1, 3.

²¹ Hu Qianying, "Shilun Qijia wenhua," pl. 12: 5 (Changshan); Wang Shihe and Qian Yaopeng, "Weibei sanyuan Changwu deng di kaogu diaocha," *Kaogu yu wenwu* 1996.1, 17, fig. 14: 7 (*hu* from Laohugou); Xibei daxue wenboxueyuan kaogu zhuan, *Fufeng Anban yizhi* (Beijing: Kexue, 2000), pl. 42: 1 (*guan*); pl. 42: 5–6 (*bei*). Also see, Wang Shihe et al., "Lin Anban sanqi wenhua yicun," *Kaogu* 1987.10, 917–25.

The presence of these vessels in a Miaodigou II context again corroborates the early date for Changshan, and, in addition, attests to interconnections between Changshan and the cultures of the lower Weishui valley in the period prior to the formation of the Kexingzhuang II culture.

If we entertain the view that the Changshan pottery presently offers the most credible source for the later Qijia ceramic assemblage, we will have to admit that the situation is complex from the beginning. Changshan clearly did not exist as a culture isolated from its neighbors, either to the east or west. On the contrary, the geographic position of this putative proto-Qijia culture, situated between the two very different cultural spheres of the late Gansu Yangshao in the west and Miaodigou II in the east, and its apparent tendency to interact and exchange cultural properties with each, may in the long run be revealed as one of the determining factors underlying the dynamics of the Qijia culture itself.

From the Tianshui site of Shizhaocun VII along the upper Weishui—a site of particular significance because of the outstanding nephrite objects discovered there—archaeologists have brought to light a large assemblage of ceramics that appear to postdate and to derive in part from those at the Changshan sites.²² The Shizhaocun VII ceramics that accord closely with those at Changshan include the cord-impressed amphora, now with a lower center of gravity and provided with a pair of small handles on either side below the mantel; the two-handled *guan*, in this case with a slightly altered profile; and most important, the three-handled drinking cup, its lower section distinctively scored with vertical incisions reminiscent of the scoring seen earlier on the Changshan one-handled cup (Figure 4).²³

These vessel types, however, are accompanied at Shizhaocun by others that have no prototypes at Changshan, but which instead attest to an association with the Kexingzhuang II culture that occupied a time horizon across Shaanxi immediately following Miaodigou II. These vessels are represented by various forms of the hollow-leg *li* and *jia* tripods, ultimately deriving from the eastcoast Dawenkou cultures, and by the *weng*, an amphora-like vessel with a wide flat mouth fitted with an elaborately designed lid having a tall cylindrical stem and a conical cap.²⁴ At the same time, we find that vessels typical of Shizhaocun VII, such as the cord-marked amphora and the three-handled drinking cup with vertical incisions, are encountered as far to the east as the Kexingzhuang II site at Xi'an.²⁵ These shared ceramic forms seem to tell of continuing intercultural traffic extending along the Wei River from Tianshui as far east as Xi'an in the period following Changshan and immediately preceding the classic phase of the Qijia in Gansu and eastern Qinghai.

If we turn our attention westward to the eventual heartland of the Qijia culture, we will discover that the earliest evidence we have of the same early Qijia presence is not to be found in the region adjacent to Tianshui, or even near Lanzhou, where we might expect it, but much farther west at the Ledu site of Liuwan, located

²² Zhongguo shehui kexueyuan kaogu yanjiusuo, *Shizhaocun yu Xishanping* (Beijing: Zhongguo dabai quangshuke, 1999), colorplates 4–8; pls. 85–116.

²³ *Shizhaocun yu Xishanping*, pl. 101 (*hu*); pl. 97 (*guan*); pl. 99: 4 and pl. 100 (three-handled *bei*).

²⁴ *Shizhaocun yu Xishanping*, pls. 103–106 (*li*, *jia*); pl. 107: 3–4 (*weng*); pl. 108 (lids).

²⁵ Zhongguo kexueyuan kaogu yanjiusuo, ed., *Fengxi fajue baogao (1955–1957 nian Shaanxi Chang'an xian Fengxi xiang kaogu fajue ziliao)* (Beijing: Wenwu, 1962), pl. 36: (*hu*); pl. 31: 13.

midway between Xi'ning and Minhe in eastern Qinghai. The evidence is provided by a three-handled beaker embellished on its body with vertical scoring—a vessel essentially identical to examples from Shizhaocun VII, and traceable as a type ultimately to Changshan (Figure 5). This beaker was recovered, not from burials at Liuwan containing Qijia-type pottery, but rather from a grave (M 30) assigned by the authors of the report to the preceding Machang period.²⁶

In accordance with this analysis, the early phase of the Qijia might be summarized in the following manner. If, as the preponderance of evidence presently indicates, we can conclude that the Shizhaocun VII ceramic assemblage derives from Changshan and that it is coeval with Kexingzhuang II and with Machang, then we can categorically eliminate both Kexingzhuang II and Machang as sources for the Qijia tradition. Moreover, it becomes clear that specific vessel types are carried from Shizhaocun VII both eastward to the Xi'an area and westward to Ledu, so that, even in the period prior to the advent of the classic Qijia, a route over which cultural exchanges took place can be discerned across a considerable distance.

The Qijia Expansion to the Northwest: Yuanyangchi and Huangniangniangtai

If we can make the assumption that the Qijia ceramic tradition and the culture associated with it derive from Changshan and not from Machang, a further question arises with regard to what may initially have motivated the early Qijia people to venture west, which, in turn, led to their eventual broad distribution throughout central Gansu and eastern Qinghai. The issue is complex and can be answered only hypothetically.

At the time of the first contacts between the Qijia and the regions to the west, the area centered around Lanzhou and extending north up the Hexi Corridor, along with a portion of eastern Qinghai, was overspread with Machang settlements.²⁷ The remains from Yuanyangchi, one of the Machang settlements in the Hexi Corridor near Yongchang, may begin provide an indication of what attracted the Qijia to this region.²⁸ The site is especially interesting because it is found within sixty kilometers of Wuwei, the location of the important and relatively early classic Qijia site of Huangniangniangtai.

From the burials at the Yuanyangchi cemetery have come a broad range of characteristic Machang vessels, such as the amphora, the two-handled *guan* and a cylindrical one-handled mug often adorned with the plastic rendition of a human head protruding from the lower section of the vessel on the side opposite the handle. All these vessels are painted in black pigment, sometimes with the addition of red, in broad geometric patterns based on checkerboard and zigzag designs, not infrequently augmented with fine-meshed trellis.²⁹

²⁶ *Qinghai Liuwan*, vol. 1, 318.

²⁷ Li Shuicheng, *Banshan yu Machang caitao yanjiu* (Beijing: Beijing daxue, 1998), 183–87.

²⁸ Yuan Anzhi, "Yongchang Yuanyangchi xinshi zhi di dai mudi di fajue," *Kaogu* 1974.5, 299–308; pls. 1–5; Po Chaofu and Yuan Anzhi, "Gansu Yongchang Yuanyangchi xinshiqi shidai mudi," *Kaogu xuebao* 1982.2, 199–227; pls. 7–16.

²⁹ Yuan Anzhi, "Yongchang Yuanyangchi," 305, fig. 12 (*hu, guan*); 306, fig. 13 and colorplate 3 (*guan*).

Far more striking at Yuanyangchi, however, are a number of composite implements recovered from some of the adult burials. These implements, fashioned of bone and inset along their edges with thin rectangular pieces of stone that constitute the cutting edge, take the form of oval-shaped choppers or scrapers; longer, slightly curved knives tapering to an upturned point; and double-edged spearheads and daggers (Figures 6–7, 9).³⁰ All these implements imply the practice of hunting, or at least the killing and butchering of animals, and their manufacture depends upon the highly specialized craft of preparing the microlithic blades inset at their edges. Most significant, and more directly pertinent to the present discussion, are two composite implements recovered from Yuanyangchi burials M 92 and M 93: a long knife and the earliest example of a true dagger so far discovered in China (Figure 7).³¹ These implements foreshadow to a surprising degree the long knife and dagger made of cast bronze from the much later Zhengzhou period finds dating around 1500–1300 BC at the Inner Mongolian site of Zhukaigou (Figure 8), and they raise important questions.³² Unlike other composite bone implements from Yuanyangchi, the handles and blades on these pieces are fashioned separately and secured together, either by lashing or by pegs inserted through the tang and the base of the handle. The tangs on both implements are shorter than on the other stone-inset bone daggers and knives from the site, and they are also narrower and thinner than the blades. While the longer, wider tangs on the more common blades from Yuanyangchi (Figure 6) could have been wrapped in cloth or cord to provide an adequate grip, the two blades from M 92 and M 93 are designed in such a way that it is difficult to see how they could have been serviceable without the addition of a separate bone or wooden handle. This seemingly more advanced two-part design, however, may have entailed a disadvantage over the more simple versions, resulting in implements more unstable and predisposed to break in half.

The reason for the design of these two implements and the addition of the separate handle is not entirely self-evident. In the case of the M 93 knife, the addition of the handle could have resulted from a requirement to produce an implement of greater length than would be allowed for by the existing piece of bone, and, indeed, the Yuanyangchi knife, approximately forty-six centimeters long,³³ has the greatest overall length of any specimen so far known—appropriate for what we would call a ‘display,’ or ceremonial item. The two-part design of the knife and dagger, however, might have a different explanation, namely that the two objects reflect the influence of a type of implement probably quite new to the region in which the blade was

³⁰ The small pieces of stone are set into grooves cut along the edges of the bone and glued in place with a resinous substance (Po Chaofu and Yuan Anchi, “Gansu Yongchang Yuanyangchi,” 211). For a recent comprehensive account of composite bone implements found in China and a discussion of their dependence on the deeply rooted and more widespread tradition in Siberia, see Yang Meili, “Gu shi fuheqi de yanjiu,” *Gugong xueshu jikan* 17.2 (1999), 147–97; 17.3 (2000), 165–91.

³¹ Yuan Anchi, “Yongchang Yuanyangchi,” pl. 51.

³² Tian Guangjin, “Nei Menggu Zhukaigou yizhi,” *Kaogu xuebao* 1988.3, 322–28; pl. 8: 3–4; Nei Menggu zizhiqu wenwu kaogu yanjiusuo and E’erduosi bowuguan, eds., *Zhukaigou—Qingtong shidai zaoqi yizhi fajue baogao* (Beijing: Wenwu, 2000), 234, fig. 192: 2–4; pl. 30: 1–2. Both implements come from M 1040. The knife measures 34.9 cm. in length; the dagger, 25.4 cm. (235). The Yuanyangchi dagger shows two nubs protruding from the base of the blade that together constitute a rudimentary guard. The feature is not observed on other bone daggers and again calls to mind the later bronze dagger from Zhukaigou.

³³ Yuan Anzhi, “Yongchang Yuanyangchi,” 304.

made of metal rather than bone inset with stone. If the knife and dagger were indeed fashioned with thin metal-bladed prototypes in mind, the idiosyncratic features that set them apart from the other bone tools at Yuanyangchi would seem more readily intelligible.³⁴

The obvious difficulty with such a proposal is that to date none of the Machang sites, including Yuanyangchi, have yielded indisputable evidence of metal artifacts.³⁵ In its favor, on the other hand, is the fact that Yuanyangchi stands chronologically on the verge of the metal age in Gansu, and its particular geographical position within the Hexi Corridor, along with its intensive microlithic industry and wide repertory of hunting implements, encountered so far at no other Machang settlement, call attention to this site as the sort of place where we might expect that the process of long-distance exchange stemming from north Eurasia might have occurred. Indeed, should metal objects one day come to light at Yuanyangchi, it will certainly come as no surprise.

The presence of a bone-mounted awl and knife from the immediately succeeding Qijia period at sites near Xi'ning in eastern Qinghai that resemble Okunevo examples from Chernovaya VIII in the Minusinsk basin of eastern Siberia give an impression of how such simple metal objects at Yuanyangchi may have looked.³⁶ But certainly the most striking illustration from this period of the intimate connection between composite bone implements with stone-inset blades and very early metal-working is the knife, or chopper, from the Qijia site of Linxia Weijiatai (Figure 10). This object, which closely resembles in its shape those from Yuanyangchi with stone-inset cutting edges (Figure 9), is similarly fashioned of bone; but in the case of the Weijiatai example, the cutting edge itself is inset, not with stone, but with small rectangular pieces of copper.³⁷ The Weijiatai implement suggests that for some time as the new metal technology was being assimilated, there continued a reliance on earlier bone prototypes and a shifting valence between composite stone-inset bone implements and those with metal blades.

While the evidence from the Qijia sites cannot be extrapolated back in time to account for the finds at Yuanyangchi, it does, if taken in conjunction with the particular character of the knife and dagger from M 92 and M 93, enhance the possibility that these two implements reflect early experiments in metal-working. If this ultimately should prove to be the case, then the history of metal-working in China would be pushed slightly farther back in time and would find its first occurrence, not in a Qijia context, but in the context of a variant of the late Machang culture localized in the Hexi Corridor. Moreover, it would open the possibility that

³⁴ Bylin-Althin herself remarked that "it is not out of the question that the characteristic bone knives with flint flakes had metallic prototypes" ("Ch'i Chia P'ing and Lo Han T'ang," 467).

³⁵ Only a very few pieces of metalwork are attributed to Machang sites. A fragmentary bronze knife is said to have been unearthed at Yongdeng Jiangjiaping (Sun Shuyun and Han Rubin, "A Preliminary Study of Early Chinese Copper and Bronze Artifacts," in Linduff, 130, 141, 14, 149, 299, fig. 31; and "A Study of Casting and Manufacturing Techniques of Early Copper and Bronze Artifacts Found in China," in Linduff, 177). A lump of copper and a copper awl were recovered from Gaomuxudi and Zhaobitan in the vicinity of Jiuquan (77). Li Shuicheng notes that the pottery from the two sites resembles that at Yuanyangchi ("Jiuquan xian Fenglexiang Zhaobitan he Gaomuxudi yizhi," in *Zhongguo kaoguxuehui, Zhongguo kaoguxue nianjian 1987* [Beijing: Wenwu, 1988], 271).

³⁶ See Fitzgerald-Huber, "Qijia and Erlitou," 47–48, 49, fig. 9.

³⁷ Tian Yuzhang, "Gansu Linxia faxian Qijia wenhua gubing tongren dao," *Wenwu* 1983.1, 76.

the Qijia may originally have been attracted to this area by the prior availability of metal implements and their potential as an article of trade.

Alternatively, the Qijia may have arrived in the Hexi Corridor in search of other materials unique to this frontier area, while metal objects presumably deriving from Eurasia became available to them only in the course of time. Yet one way or the other, their contact with the inhabitants of settlements like Yuanyangchi almost certainly resulted, sooner or later, in their acquisition of metal objects and metal technology, which, from an historical point of view, grew to become one of their most important cultural properties.

Huangniangniangtai, situated close to Yuanyangchi and located approximately the same distance east of the foothills of the Lenglongling mountains, is one of the 'classic' Qijia sites, which I believe is correctly interpreted by Debaine-Francfort as one of the earliest.³⁸ From the burials at this site were uncovered typical Qijia ceramics, including the hallmark two-handled beaker, a version of the three-handled beaker, the amphora and the hour-glass *guan*, all of which closely depend upon the family of earlier Changshan types (Figures 1–2).³⁹ Along with these were uncovered a handful of painted two-handled *guan* derivative from late Machang pottery in their shapes and decor.⁴⁰ The pottery assemblage at Huangniangniangtai demonstrates both the penetration into the northwest of a ceramic tradition whose roots ultimately lie in the eastern Gansu-Ningxia region and the incorporation of some aspects of the local Machang ceramic tradition. Also found at Huangniangniangtai are a total of nearly 900 microlithic implements, including arrowheads and scrapers, testifying to the continuation of an industry already witnessed at neighboring Yuanyangchi.⁴¹

The wealth of metal artifacts from Huangniangniangtai represents the largest number so far recovered from any Qijia site.⁴² The nature of these artifacts strongly points to contact with northern population groups, and several may well have been imported items: the coiled copper earring, familiar as a type all across the Eurasian steppe, and the fragmentary perforated knife handle bearing a zigzag pattern in relief, which is strongly reminiscent of the decor on similar knife handles associated with the Seima-Turbino, a metallurgically sophisticated group from the Altai mountain

³⁸ Guo Deyong, "Gansu Wuwei Huangniangniangtai yizhi fajue baogao," *Kaogu xuebao* 1960.2, 53–71; Wei Huaiheng, "Wuwei Huangniangniangtai," 421–48; Debaine-Francfort, *Du Néolithique à l'Âge du Bronze en Chine du Nord-Ouest*, 277; Fitzgerald-Huber, review article, 257–58.

³⁹ Wei Huaiheng, "Wuwei Huangniangniangtai," pl. 6: 3 (hour-glass-shaped *guan*).

⁴⁰ The painted pottery at Huangniangniangtai appears to belong to a phase transitional between late Machang and the ensuing ceramic style of the Hexi Corridor Siba culture; see Li Shuicheng, "Siba wenhua yanjiu," in Su Bingqi, ed., *Kaogu xue wenhua lunji*, (Beijing: Wenwu, 1993), 107–114; radiocarbon dates for the Siba culture are provided on pp. 90, 94. Painted *guan* from burials as far north as the site of Panjiazhuang at Anxi compare closely with those from Huangniangniangtai (Xibei daxue kaogu zhuan, Gansu sheng wenwu kaogu yanjiusuo, Anxi xian bowuguan, "Gansu Anxi Panjiazhuang yizhi diaocha shijue," *Wenwu* 2003.1, 69, fig. 7; illustrations on the front cover and inside the back cover, figs. 1–2; Wei Huaiheng, *Wuwei Huangniangniangtai*, pl. 8: 3–5).

⁴¹ Guo Deyong, "Gansu Wuwei Huangniangniangtai," 64; Debaine-Francfort, *Du Néolithique à l'Âge du Bronze en Chine du Nord-Ouest*, 115. The composite bone knife with stone-inset cutting edge also continues to make an appearance at Huangniangniangtai (Wei Huaiheng, "Wuwei Huangniangniangtai," 434, fig. 19: 14.)

⁴² Sun Shuyun and Han Rubin provide a list of copper artifacts from Huangniangniangtai and metal objects from other Qijia sites ("Casting and Manufacturing Techniques of Early Copper and Bronze Artifacts from Gansu," in Linduff, 179–80). See also Debaine-Francfort, *Du Néolithique à l'Âge du Bronze en Chine du Nord-Ouest*, 319–21; Fitzgerald-Huber, review article, 264–64.

area of southeastern Siberia.⁴³ Metalwork from Qijia sites farther south in central Gansu equally evince a northern derivation: the ring-handled knife and the socketed axe from Minxian Xinglin; the long, socketed adze from Guanghe Qijiaping; and the axe with a flaring cutting edge from Yongjing Qinweijia.⁴⁴ Many implements, on the other hand, both from Huangniangniangtai and other Qijia sites, such as simple knife-blades, needles, bone-mounted awls and pins, while based on Eurasian prototypes, are far more likely to be of local manufacture, as the Qijia increasingly gained for themselves the basic skills of metal-working.

In view of present evidence, it seems reasonable to surmise that northern population groups, who were in possession of at least rudimentary metal-working techniques, may have been attracted to the Yongchang-Wuwei region of the Hexi Corridor by the presence of settled agricultural communities with whom they could trade for food stuffs and other commodities. They may also have been drawn to the region by the availability of copper ore.⁴⁵ Correspondingly, the Qijia community at Huangniangniangtai was founded in all likelihood primarily as a frontier trading outpost where prosperity depended in considerable measure on the ingenuity of its people in capitalizing on the trade in metal objects, in addition to other goods they may also have obtained from northern population groups in barter.

The remarkable geographical reach of the Qijia culture during its classic phase is perhaps best comprehended in terms of its strong prehistory of interacting with different cultures, going back to the time of Changshan and Shizhaocun, and its apparent proclivity for trade. Far to the west in the Tongde and Guinan regions of Qinghai, archaeologists have discovered numerous Qijia settlements.⁴⁶ At Zongri in Tongde, we meet again with the two-handled beaker, along with coiled copper earrings and a distinctive bone fork, which is seen at Huangniangniangtai.⁴⁷ To the northeast, in Inner Mongolia, adjacent to the northernmost reaches of Ningxia, Qijia ceramics have been uncovered at Alxa Zuoqi (Bayinhaote), while in the third stratum at the well-known site of Zhukaigou, in the Inner Mongolian region of Ejinhoro, north of the present Shaanxi border, the classic two-handled beaker has been recovered in conjunction with the earliest metal objects from this region, comprising metal needles and awls, in addition to coiled copper earrings.⁴⁸ Remains

⁴³ A case for the north Eurasian derivation of several Qijia metal objects is made by Fitzgerald-Huber, "Qijia and Erlitou," 40–52.

⁴⁴ Yang Yimin, "Gansu Minxian Xinglin Qijia wenhua yizhi diaocha," *Kaogu* 1985.11: 978, fig. 2: 10–11; Debaine-Francfort, *Du Néolithique à l'Âge du Bronze en Chine du Nord-Ouest*, 104, fig. 61: 1; Xie Duanju, "Gansu Yongjing Qinweijia Qijia wenhua mudu," *Kaogu xuebao* 1975.2: 73, fig. 2; pl. 12: 16.

⁴⁵ Copper sources have been identified near Gulang, south of Wuwei (Noel Barnard and Sato Tamotsu, *Metallurgical Remains of Ancient China* [Tokyo: Nichiosha, 1975], 24–25; Sun Shuyun and Han Rubin, "Casting and Manufacturing Techniques of Early Copper and Bronze Artifacts from Gansu," in Linduff, 189–190, 274–77, maps. 5–8.

⁴⁶ Chen Honghai et al., "Shilun Zongri yizhi de wenhua xingzhi," *Kaogu* 1998.5: 15–26.

⁴⁷ Chen Honghai et al., "Qinghai Tongde xian Zongri yizhi fajue," *Kaogu* 1988.5: 9, fig. 36: 8 (*bei*); 14, figs. 35–36 (earrings); 13, fig. 32: 8; pl. 5: lowermost (fork). See also, Chen Honghai and Ge Sangben, eds., *Zongri yizhi: wenuwu jingcui xuanji lunshu* (Chengdu: Sichuan kexue jishu, 1999), 123, upper (*bei*); 132, lower (earrings); 26, center and 133, center (fork). A bone fork from Huangniangniangtai is illustrated in Guo Deyong, "Gansu Wuwei Huangniangniangtai," pl. 4: 6.

⁴⁸ Qi Yonghe, "Nei Menggu Baiyinhaote faxian de Qijia wenhua yiwu," *Kaogu* 1962.1, 22 (Alxa Zuoqi); Tian Guangjin, "Nei Menggu Zhukaigou," 315, fig. 18: 13 (*bei*); p. 316, fig. 19: 3 and 317 (metal objects); *Zhukaigou*, pl. 63: 6–7 (beakers); pl. 33: 2 (metal objects).

of Qijia pottery have been found still farther to the northeast at the Inner Mongolian site of Liangcheng Damiaopo, southeast of Huhehaote.⁴⁹ These far-flung sites seem to follow an arc corresponding to the limit of arable lands along the north that would have favored contact with hunters and herders from the northern hinterlands.

Although the impact of the introduction of metal and metal-working on the individual inhabitants of the Qijia communities may have actually been minimal, in the sense that their daily lives would have been virtually untouched by it, metal in the role of a commodity may well go some way in explaining the presence of the Qijia ceramics in finds across the north at Zhukaigou and Liangcheng and the fact that the culture flourished over such a wide area of Gansu and Qinghai.

The Qijia Jades and the Link to the East

In the larger perspective of things, the Qijia unquestionably owe their unique position to their possession of metal objects, which so far pre-date any others found in China and to the tempting hypothesis that these metal objects reflect early contact with the larger world of the Eurasian steppe. But by now this perception of the Qijia may seem limited and in need of a degree of modification in light of newer revelations about this culture. Despite the importance of metal to the Qijia and the possible association, direct or indirect, with northern populations groups, it may have been something else, namely their long-standing ties to the Wei river area of Gansu and to a cultural world still farther east, that carried at least equal weight in terms of their own sense of identity and their own self-image.

As pointed out by Debaine-Francfort and others, metal objects, with the exception of small ornaments of personal attire, are rarely found in Qijia burials, even in the high-status graves at Huangniangniangtai, such as M 48.⁵⁰ This observation raises the question whether the Qijia themselves considered metal objects to be among their prestige goods and whether these objects were in any significant way integrated into their ritual practices. Instead, the high-status burials at Huangniangniangtai were provided with a lavish array of jade and stone disks and rings (Figure 11).⁵¹ The Qijia burial M 200 at the distant site of Zongri, which yielded a nephrite *bi* and several jade blades, additionally indicates that the use of jade items in the context of burial rites was widespread.⁵²

It is the new discoveries of jade artifacts associated with the Qijia and the

⁴⁹ Fu Zhanjun, "Nei Menggu Liangcheng xian Daihai zhou wei gu yizhi diaocha," *Kaogu* 1989.2, 102, fig. 7: 3.

⁵⁰ Debaine-Francfort, *Du Néolithique à l'Âge du Bronze en Chine du Nord-Ouest*, 260. The exception to this rule is the mirror from M 25 at the Guinan Gamatai sites and two others reported from the cemetery at Guanghe Qijiaping (103).

⁵¹ In all, 264 jade and stone disks have been recovered from Huangniangniangtai (Wei Huaiheng, "Wuwei Huangniangniangtai," 441).

⁵² Chen Honghai et al., "Qinghai Tongde xian Zongri," pl. 5: 1–2; Chen Honghai and Ge Sangben, *Zongri yizhi*, 28–30; 127, top. More recently a number of jades, including segmental disks have been recovered from M 17 at the Minhe site of Lajia in eastern Qinghai. Other pieces such as a large knife have been found at the same site on what is believed to have been an altar (Zhongguo shehui kexueyuan kaogu yanjiusuo Gan-Qing gongzuodui, Qinghai sheng wenwu kaogu yanjiusuo, "Qinghai Minhe Lajia yizhi Qijia wenhua jitan he ganlanshi jianzhu," *Kaogu* 2004.6, 5, figs. 4–5.

renewed interest in those previously recovered at sites like Huangniangniangtai that begin to afford an altered view of this culture.⁵³ We are struck by the beauty of the jade objects unearthed at Shizhaocun VII and by those from Zongri, which alone among the material excavated at these sites, give us some sense of an aesthetic and intellectual dimension of this culture beyond the domain of a subsistence economy otherwise reflected by most of the preserved remains from these communities.

Many questions concerning the Qijia jades remain nevertheless unanswered. It is uncertain from the placement of the disks and rings in burials, such as those at Huangniangniangtai, which might have served as the adornments of formal attire and whether many, like the large disks from M 48, were symbolic objects placed upon the corpse or atop the shroud as gifts only at the time of burial.⁵⁴ Moreover, while the large majority of nephrite and stone objects were assuredly of local manufacture and not directly obtained through long-distance trade, the sources of the nephrite used in fashioning many of the *bi* and rings are also undetermined, although some may well have been located at no great distance, like those identified by Wen Guang in the vicinity of Linxia.⁵⁵ Such minor uncertainties aside, however, the inclusion of these items in a ritual context unmistakably reflects customs conscientiously maintained over time and despite the varying circumstances of different locations.

But if we are to grasp the fuller significance of jade in the context of the Qijia culture, we will need to extend our inquiry farther afield in an attempt to identify a potential point of origin for the specific jade forms found at the Qijia sites. Assuming that what we encountered at Shizhaocun VII corresponds to a relatively early phase in the development of the Qijia culture, then the *bi* and other jades discovered at Huangniangniangtai and Zongri can be interpreted as a continuation of the forms found at this more easterly site. In turn, the single major jade-working tradition that currently presents itself as a hypothetical source for the jade forms at Shizhaocun VII is that associated with the Taosi culture, centered along the lower Fen River in southwest Shanxi.⁵⁶ The jades from the burials at the Xiangfen site and at the related site of Linfen Xiajin provide the only prototypes that we are presently able to ascertain for the five most diagnostic forms from Shizhaocun and the Qijia settlements. These include: the *bi*; the *cong*; the *huang*, or ring; the segmental disk made up of two or more segments drilled with small holes near the adjoining edges; and the harvesting knife, perforated along the upper edge for the purpose of securing

⁵³ Yang Meili has dealt extensively with the Qijia jades in the following publications: "Qijia wenhua yuqi di xingzhi yu tese," *Danjiang shixue* 11 (2000), 1–20; "Huanghe shang, zhong you shiqian wenhua yuqi yanjiu," *Gugong xueshu jikan* 19.2 (2001), 69–104.

⁵⁴ Ye Maolin believes the disks served as burial gifts ("Qijia wenhua de yushiqi," *Kaogu qiuzhi ji 1996 kaogu yanjiusuo zhong Qingnian xueshu taolunhui wenji* [Beijing: Zhongguo shehui kexue, 1997], 258).

⁵⁵ Wen Guang, verbal communication, September 20, 1996. Ye Maolin discusses the important evidence of local stone-working at the Haizang park, less than a mile from the Huangniangniangtai site ("Qijia wenhua," 253–55, 257, 259). Reworked splinters of nephrite and other stone material placed in the burials also support the probability of local manufacture (Wu Ping, "Qijia wenhua yu shiqi," *Qinghai wenwu* 1996.10, 68–70). I am indebted to Yang Mei-li for providing copies of these two articles.

⁵⁶ See Yang Meili, "Qijia wenhua yuqi di xingzhi yu tese," 3–7. — Ye Maolin suggests that many of the Qijia jade forms must ultimately derive from the east, but he makes no reference to Taosi as a possible source of inspiration ("Qijia wenhua," 26).

a mounting.⁵⁷ In addition to these types, a distinctive flat rectangular axe with a stepped tang from the Qijia site of Minxian Xinglin also finds a direct parallel with an axe unearthed at Taosi.⁵⁸

While a link of some sort assuredly exists between the Taosi jade forms and those seen at Shizhaocun VII and Huangniangniangtai, the nature of this connection remains elusive because of the dearth of information from the intervening region. Almost no jade objects have been forthcoming from sites along the Wei River, with the sole exception of the Kexingzhuang II sites at Xi'an, where a small number of fragmentary pieces, such as a disk and a dark-green nephrite knife have been unearthed.⁵⁹ Given the likelihood of the transfer of ceramic vessel types from Kexingzhuang II to Shizhaocun, Kexingzhuang might offer a plausible point of transmission for jade forms eastward from Taosi, but the actual evidence is slim.

What can be said with reasonable conviction, however, is that the east-west transmission of jade forms did not consist merely of individual objects, divorced from their original purpose and context, traded upstream along the Wei, and dispersed to the settlements beyond and replicated locally from single items of trade. That this is the case can be deduced from the fact that in the burials both at Taosi and Huangniangniangtai the placement of the jades is the same, with the disks found atop the skeleton, and the smaller rings or segmental rings located on or near the arm (Figure 12).⁶⁰ Because these jade types are evidently accompanied at the Qijia sites by customs of personal adornment and ritual function comparable to those at Taosi, some form of a deeper cultural affiliation, or, at the very least, cultural affectation, apparently accompanied the jade forms themselves.⁶¹ Whatever the particular circumstances may have been, we may conclude that the Qijia wished to assert an affiliation, however distant and fanciful it may in actuality have been, with the more refined centers of civilization to the east, and that they aspired in some measure to emulate their customs.

⁵⁷ Gao Wei and Li Jianmin "1978–1980 nian Shanxi Xiangfen Taosi mudi fajue jianbao," *Kaogu* 1983.1, 38, fig. 10; pl. 7: 1–3, 6; Song Jianzhong and Xie Xinmin, "Shanxi Linfen Xiajin mudi fajue jianbao," *Wenwu* 1998.12, 11, figs. 15 and 16: 1–2; pl. 1; Liang Xingpeng et al., "Shanxi Linfen Xiajincun Taosi wenhua mudi fajue baogao," *Kaogu xuebao* 1999.4, 471, fig. 16; 474, fig. 18: 10, 12–13; 477, fig. 19; pl. 12: 1, 2–5; pl. 13: 4–5; pl. 14: 1–4; pls. 15–16.

⁵⁸ Yang Yimin, "Gansu Minxian Xinglin Qijia wenhua yizhi diaocha," *Kaogu* 1985.11, 978, fig. 2: 9; Gao Wei and Li Jianmin, "1978–1980 nian Shanxi Xiangfen Taosi," pl. 7: 5.

⁵⁹ *Fengxi fajue baogao*, pl. 34: 13–14; Wang Changqi, ed., *Zhonghua guobao: Shaanxi zhengui wenwu jicheng yuqi quan* (Xi'an: Shaanxi renmin jiaoyu, 1999), pl. 17.

⁶⁰ Wei Huaiheng, "Wuwei Huangniangniangtai," 426, fig. 6 and pl. 1: 2 (M 83); 429, fig. 13 (M 38); 431, fig. 17 and pl. 2: 3 (M 48); Song Jianzhong and Xie Xinmin, "Shanxi Linfen Xiajin," 6, fig. 3 and 7, fig. 6 (M 47); 6, fig. 3: 5 and 7, fig. 8 (M 70); Liang Xingpeng et al., "Shanxi Linfen Xiajin," 464, fig. 6 (M 8); fig. 7 and pl. 8: 2 (M 13); 465, fig. 10 and pl. 8: 1 (M 40).

⁶¹ It seems doubtful that this self-conscious affiliation with the more easterly cultures extended back to Changshan times. Although a small number of ceramic vessel types appear to have been transmitted to the contemporary Miaodigou II cultures in the Baoji and Fufeng areas, there are no indications from the published remains from Changshan of influence passing in the opposite direction. The absence of jade *bi* and *cong* at the Changshan sites is probably accountable simply by the circumstance that these jade forms were not an established cultural property at that point in time even in Shanxi and Henan.

The Qijia *He*

The Qijia *he* made in imitation of a sheet-metal original that so fascinated Bylin-Althin extends the story of early cultural exchange farther east to Henan (Figure 13). The vessel was purchased by Andersson in Lanzhou, and its source is thus unknown.⁶² But the association of this vessel with the Qijia culture has not been questioned, and following the excavation of a *he* with essentially the same kind of domed top and cylindrical spout from the Qijia site of Jishishan Xinzhuangping, west of Linxia, it is now securely established.⁶³ The Xinzhuangping vessel differs, however, from Andersson's *he* in its simple jar-like shape, and it lacks the imitation rivets at the top of the handle and on the dome. The dome itself is also flatter and open at the back in distinction to the nearly circular hole on Figures 15–16. In short, the Xinzhuangping vessel seems at one remove from the unprovenanced example where such pains were taken to replicate the details of the hammered copper prototype.⁶⁴

The distribution of the *he* is not restricted to Gansu alone; the vessel is also seen to the east at several locations. In Henan, vessels of this type, and their presumed sheet-metal counterparts, must have been produced well into the Erlitou period (ca 1900–1500 BC), when cast bronze had begun to replace hammered copper as the dominant metal-working technique. The single example of a *he* made in imitation of a sheet-metal original datable to the pre-Bronze Age period is one unearthened from the late Longshan stratum at Xichuan Xiawanggang in southwest Henan (Figure 14).⁶⁵ Despite the Xiawanggang *he*'s more simple profile, the dome, its cylindrical spout and imitation rivets leave no doubt as to the identity of the vessel type.

Farther east, the *he* is seen again at Yichuan Nanzhai, south of Luoyang (Figure 15). This version, with its tall neck, cushion-like body and ring foot, is more similar in its proportions to Andersson's vessel. It is dated to the Erlitou period II on the basis of other ceramics found in the same burial (M 26).⁶⁶ From the Yanshi Erlitou site itself comes a particularly handsome example of this vessel type, showing a long cylindrical spout molded at the end (Figure 16). Here, the domed cover and the long strap handle are attached, almost arbitrarily, to a vase-shaped *hu*, a vessel

⁶² Andersson, "Researches into the Prehistory of the Chinese," 81.

⁶³ Gansu sheng bowuguan, "Gansu Jishishan xian Xinzhuangping Qijia wenhua yizhi diaocha," *Kaogu* 1996.11, 50, fig. 5:18; pl. 6: 2.

⁶⁴ A puzzling feature of Andersson's *he* is its dark grey ware, which is exceedingly rare at the Qijia sites but standard for ceramics in Henan during the Longshan and Erlitou periods (see Debaine-Francfort, *Du Néolithique à l'Âge du Bronze en Chine du Nord-Ouest*, 307–308; Bylin-Althin, "The Sites of Ch'i Chia P'ing and Lo Han T'ang in Kansu," 392–93; 417–18). The Xinzhuangping *he*, by contrast, is fashioned of the tan-colored ware typical for the vast majority of Qijia ceramics.

⁶⁵ Henan sheng bowuguan, *Xichuan Xiawanggang* (Beijing: Wenwu, 1989), 230–63; pl. 91: 6.

⁶⁶ Henan sheng wenwu kaogu yanjiusuo, "Henan Yichuan xian Nanzhai Erlitou wenhua muzang fajue bao" *Kaogu* 1996.12, 38–40; pl. 4: 4. A grey ware *he* with a profile similar to the Nanzhai vessel is reported to have come from Wushan, west of Tianshui in Gansu. A slide of this *he*, which was on exhibition some years ago in the Gansu Provincial Museum, was kindly given to me by Lothar Ledderose.

In the Erlitou period the domed cover is adapted to a different sort of pouring vessel supported by three hollow pointed legs (*lihe*). This vessel continues through Erlitou IV, see, for example, Zhongguo shehui kexueyuan kaogu yanjiusuo, *Erlitou taoqi jicui* (Beijing: Zhongguo shehui kexue, 1995), 32; pls. 6, 14, 69, 97, 100, 102, 118, 122, 194, 226, 244, 255, 278–79, 302, 381.

that exists independently as a form within a specialized class of exceptionally well-made, heavily potted, wheel-turned grey wares, apparently of limited production. Like other examples of gray ware, the *he* is embellished by an encircling decorative band containing a herringbone pattern.⁶⁷ The other nine vessels recovered from the same grave (844YIV M51) establish that this *he*, like the one from Nanzhai, dates to Erlitou II.⁶⁸

The fact that the *he* is found in both Gansu and Henan naturally introduces the question where this ceramic vessel-type and its elusive sheet-metal prototype originated. As far as the *he* itself is concerned, much of the evidence presently available would seem to favor Henan. In Gansu throughout the Neolithic, ceramic pouring vessels of any kind, much less sophisticated forms with cylindrical spouts, are conspicuous by their near absence, whereas the ceramic inventory of the late Henan and Shanxi Longshan is replete with a variety of pouring vessels, including the *kui* and *lihe*, which betray their ultimate Shandong heritage by their pointed hollow legs.⁶⁹ Moreover, while the remnant of what is thought to be a metal vessel from the late Henan Longshan site of Dengfeng Wangchenggang (Period IV) falls beyond the present discussion because it is of cast bronze, the fragmentary remains of a few ceramic vessels from earlier strata at this site, along with two pieces recovered by Andersson in Henan, are possible evidence of a nascent tradition of sheet-metal vessels.⁷⁰ These pieces have flat, disk-shaped bottoms, wider in circumference than the rest of the vessel and in some cases supported by three diminutive feet. The bodies are dome-shaped, just like the top of the *he*, and they would seem to reflect a similar technique used to fashion the metal prototype by hammering out the copper around a hemispherical model, probably made of wood. One of the vessels found by Andersson seems even to have been provided with a cylindrical spout.⁷¹

Although the weight of evidence presently seems to favor Henan as a point of origin for the tradition of sheet-metal vessels and their ceramic imitations, the issue can hardly be considered settled. Radiocarbon dates for the Qijia and Henan Longshan sites, all of which fall within approximately the same chronological range, cannot assist in the solution because they overlap when their margin of error is

⁶⁷ For other examples of this class of Erlitou pottery, see *Erlitou taoqi jicui*, 41, fig. 3; 47, fig. 13; 113, fig. 93.

⁶⁸ *Erlitou taoqi jicui*, 114, fig. 95.

⁶⁹ Li pouring vessels from the Dawenkou phase in Shandong are illustrated in *Shandong sheng wenwu guanlichu, Jinan shi bowuguan, Dawenkou: Xinshiqi shidai muzang fajue baogao* (Beijing: Wenwu, 1974), pl. 78. Longshan period *gui* and *lihe* are found in a late Kexingzhuang II context as far west as Lintong Jiangzhai (Period V) and Fengxi Kexingzhuang; see, Xi'an Banpo buwuguan, *Jiangzhai* (Beijing: Wenwu, 1988), vol. 1, 337, fig. 250: 1-2; vol. 2, pl. 208: 1-2; *Fengxi Kexingzhuang fajue baogao*, 61, fig. 38: 1-2; pl. 29: 1-2.

⁷⁰ See, for example, a small pouring vessel with a cylindrical spout and flat bottom (the body is not preserved) from Period II, and a second small, flat-bottomed vessel from Period III (Henan sheng wenwu yanjiusuo, *Zhongguo lishi bowuguan kaogu bu, Dengfeng Wangchenggang yu Yangcheng* [Beijing: Wenwu, 1992], 54, fig. 27: 14; 77, fig. 38: 4). The bronze fragment from Period IV is discussed on pp. 99, 327-28 and illustrated on p. 100, fig. 50: 5 and pl. 29: 16. The two vessels found by Andersson are reproduced in "Researches into the Prehistory of the Chinese," pl. 35: 1-2.

⁷¹ Andersson, pl. 35: 2.

taken into consideration.⁷² Whether the ceramic *he* and its sheet-metal counterpart originated in Gansu or derived from the east, it was evidently a cultural property more rare at the Qijia sites than the jade forms, which were more surely acquired from the east, and which were plentifully represented even during the early phase at Huangniangniangtai.

Whatever the particular case may have been, the collective evidence of the Qijia jades and their dependence upon the more easterly jade-working in southwest Shanxi, together with the equally indisputable evidence provided by the *he* of a relationship between the Qijia and the Henan Longshan, reveals a functioning path of communication and exchange extending from Huangniangniangtai in the Hexi Corridor along the Weishui and beyond to Henan. Goods of Eurasian derivation, including in particular metal objects and the technique of metal-working itself could plausibly have traveled this route. It seems clear that as early as around the year 2000 BC a route from Eurasia was available almost as far east as it was in the days of the Silk Road.

⁷² For radiocarbon dates for the Qijia and Henan Longshan sites, see Debaine-Francfort, *Du Néolithique à l'Âge du Bronze en Chine du Nord-Ouest*, 361, 366. An interesting pitcher with a horizontally fluted body recovered from a late Dawenkou period burial (M 2110) at Jiaoxian Sanlihe in Shandong has a superstructure with a cylindrical spout resembling the dome on a *he*. The vessel exhibits no overt metallic qualities and theoretically might represent the ceramic form of the *he* before it was appropriated as a metal form, but it could equally derive from Henan. The radiocarbon date for M 2110 of 1905±120 BC is again of no use in resolving the issue (see, Zhongguo shehui kexueyuan kaogu yanjiusuo, *Jiaoxian Sanlihe* [Beijing: Wenwu, 1988], 63, fig. 35: 2; 124–25, figs. 68 a and b; pl. 27: 3; *Zhongguo kaogu xue zhong tan shisi niandai shuajuji*, 67). A second pitcher with a similar superstructure and short cylindrical spout was excavated from the late Kexingzhuang stratum (Period V) at Lintong Jiangzhai in the eastern Wei River valley area of Shaanxi, but we have no means of determining whether this vessel or the one from Sanlihe is the earlier (*Jiangzhai*, vol. 1, 327, fig. 250: 5; vol. 2, pl. 209: 1).

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Figure 1.

Pottery amphora; two handled beaker; three handled cup. From Gansu Wuwei Huangniangniangtai. After *Kaogu xuebao* 1978.4, pl. 4:2; pl. 5:3; pl. 9:3.



Figure 2.

Pottery amphora; one-handed jug with vertical scoring; three-handled cup. From Gansu Zhenyuan Changshan (Lower Stratum). After *Kaogu yu wenwu* 1980.3, pl. 12:2; pl. 13:2, 5.

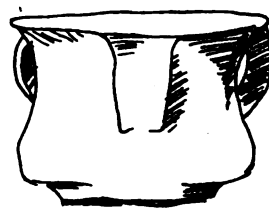
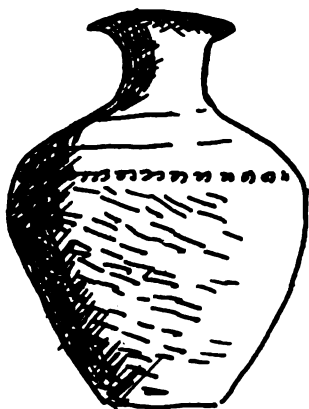
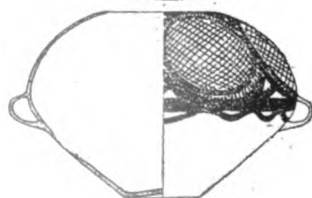
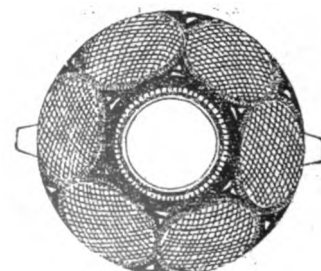
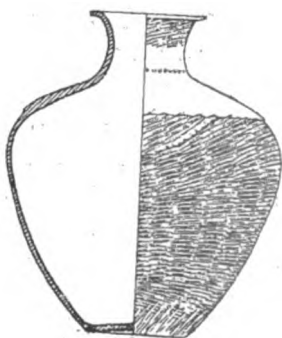


Figure 3.

Pottery amphora; one-handed jug with vertical scoring; Banshan painted ware amphora. From Ningxia Guyuan Dianhe M 2. After Debaine-Francfort, 173, fig. 112.



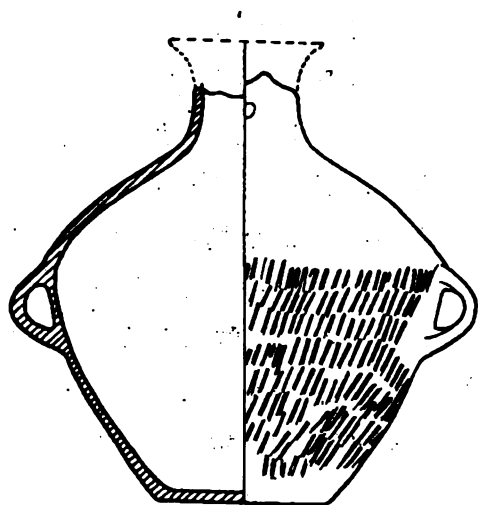


Figure 4.
Pottery amphora and three-handled cup with vertical scoring. From Gansu Tianshui Shizhaocun (Period VII). After *Shizhaocun yu Xishanping*, 202, fig. 156:3, 8.

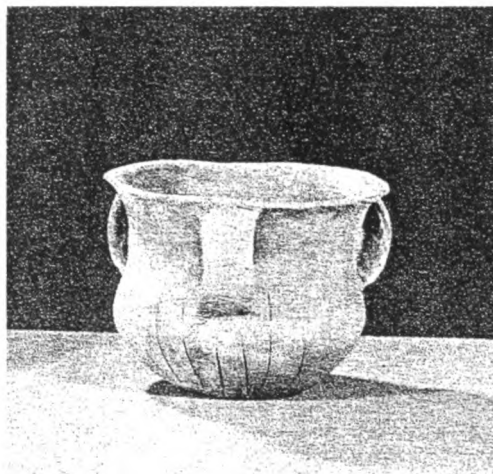
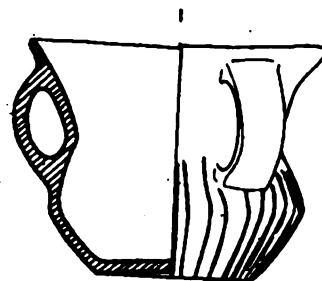


Figure 5.
Pottery three-handled cup with vertical scoring. From Qinghai Ledu Liuwan. After *Qinghai Liuwan*, pl. 152:1.

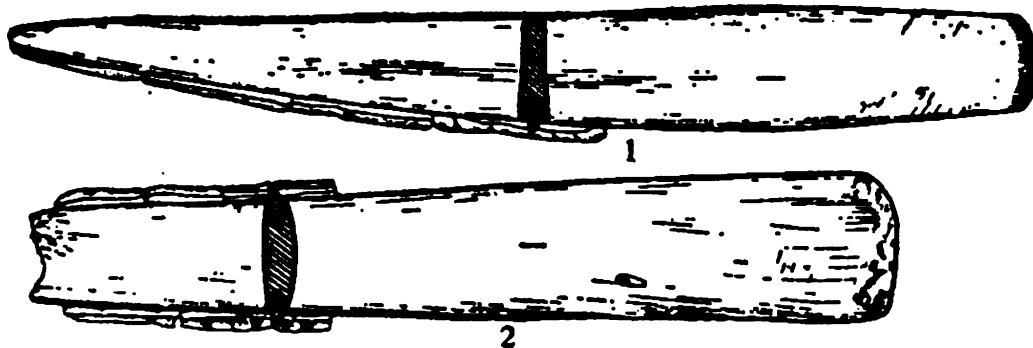


Figure 6.
Bone implements with stone inset cutting edges. From Gansu Yongchang Yuanyangchi. After *Kaogu xuebao* 1982.2, 209, fig. 17:1-2.

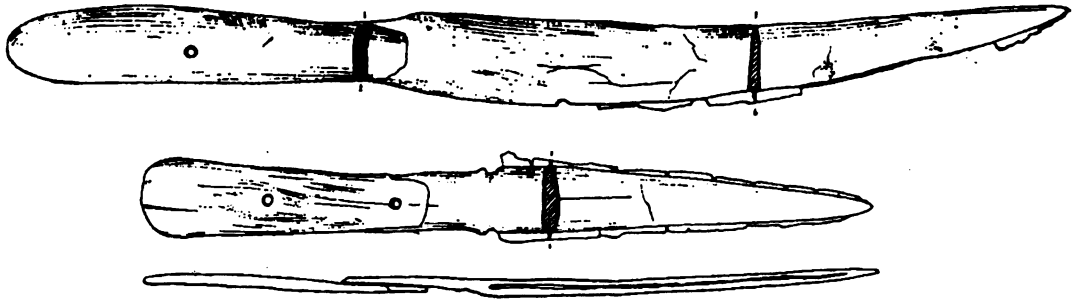


Figure 7.

Bone knife and dagger with stone inset cutting edges. From Gansu Yongchang Yuanyangchi. After *Kaogu* 1974.5, 304, fig. 10.

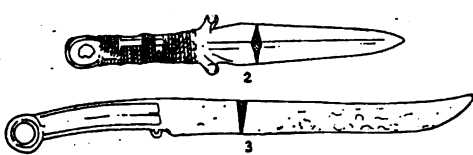


Figure 8.

Cast bronze dagger and knife. From Ejinhoro Zhukaigou (Period V), Inner Mongolia. After *Kaogu xuebao* 1988.3, 325, fig. 29:2-3.

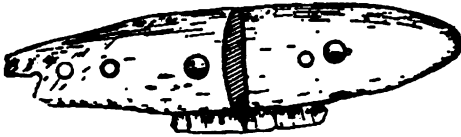


Figure 9.

Bone chopper with stone inset cutting edge. From Gansu Yongchang Yuanyangchi. After *Kaogu xuebao* 1988.2, 209, fig. 17:4.

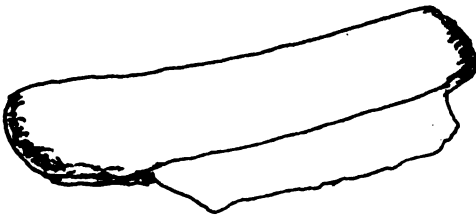


Figure 10.

Bone chopper with inset copper cutting edge. From Gansu Linxia Weijiatai. After *Wenwu* 1983.1, 76.

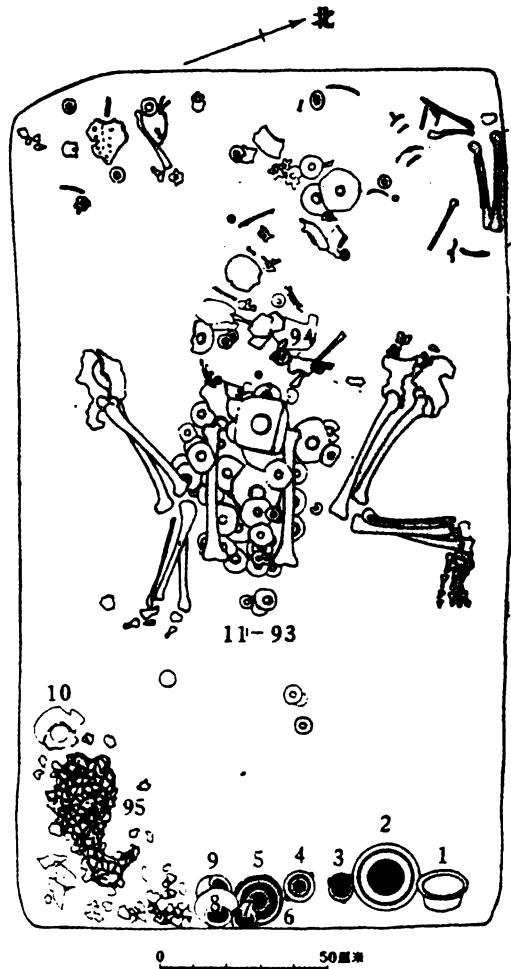


Figure 11.

Jade disks in burial M 48 at Gansu Wuwei Huangniangniangtai. After *Kaogu xuebao* 1978.4, 431, fig. 16.

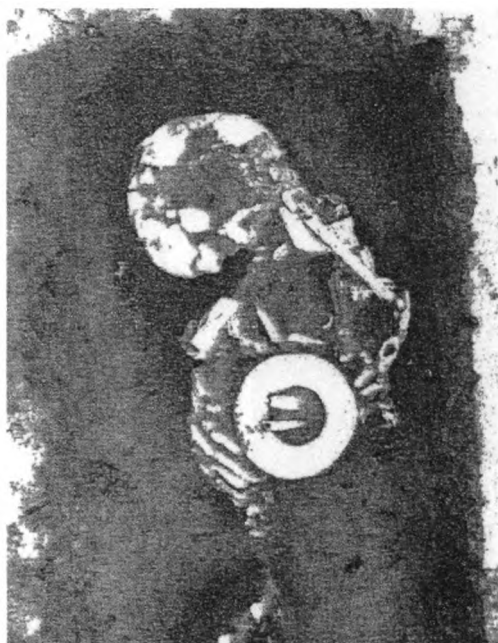


Figure 12.
Jade disk in burial M 70 at Shanxi Linfen Xiajin. After *Wenwu* 1998.12, 8, fig. 8.

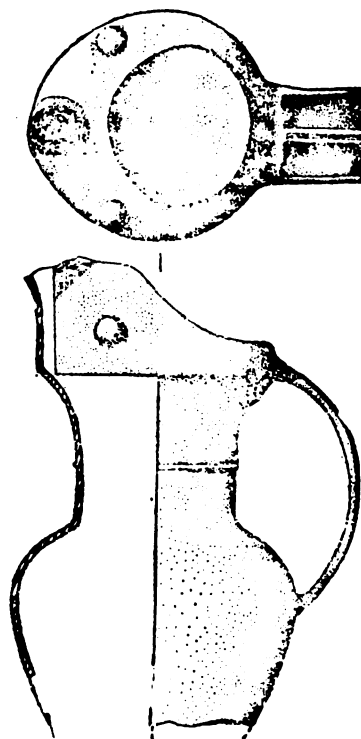


Figure 14.
He. Grey ware. Henan Xichuan Xiawanggang (Late Longshan Period). H. 27 cm. After *Xichuan Xiawanggang* (Beijing: Wenwu, 1989), 260, fig. 253.



Figure 13.
He. Grey ware. Acquired by J.G. Andersson in Lanzhou. H. 10.8 cm. After *BMFEA* 18 (1946), pl. 22:5.

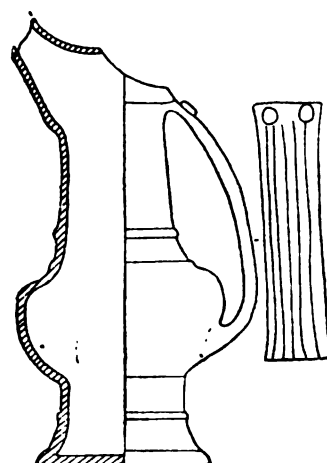


Figure 15.
He. Gray ware. Henan Yanshi Erlitou (Period II). H. 26 cm. After *Erlitou taoqi jicui* (Beijing: Zhongguo shehui kexue, 1995), pl. 10.



Figure 16.
He. Gray ware. Henan Yichuan Nanzhai
(Erlitou Period II). H. 32 cm.
After *Kaogu* 1996.12, 39, fig. 6:2.

Western Influences on the Early Chinese *Qin*-Zither

by

Bo Lawergren

Foreign influences on the *qin* have been considered earlier,¹ but the arguments were brief. The present, more expansive, evidence chiefly concerns the shape of the *qin*, its tuning keys, and some pre-Han texts. The discussion clarifies what is indigenous features, and what is not. Before embarking on the project (section B), some aspects of ancient Asian instruments are reviewed (section A).

A. The East-West Divide in Asia

Broadly speaking, Chinese music passed through two distinct phases between the Shang and Song dynasties. Before the beginning of our era, music sprang mainly from indigenous sources. Afterward, much came from Central Asia via the Silk Road.² Whereas China was closed to foreign music in the first phase, it struck the opposite stance in the second. Perhaps this bimodal historical model eventually will prove too simplistic but, at the moment, it is useful. A related bimodality emerges when we examine ancient instruments across the Asian continent, east to west. Both ends had radically different types of instruments.

1. The Eastern corpus of instruments

The archaeological records of the Shang dynasty reveal a broad array of instruments. Oracle Bone inscriptions identify them and their social context. The extant instruments in figure 1 (bronze drum, pan-pipe, mouth-organ, ocarina, single pipe) date to Shang or early Zhou. The representations (hand-bell, chime-sets of bells and stones, large drum, and clapper-drum) were produced later, but Shang knew similar instruments.

I am grateful for the sage advice from Alan Berkowitz, Victor H. Mair, John S. Major, Sugawara Tomoko, Marilyn Wong Glaysteen, and Jung-Ping Yuan.

¹ Bo Lawergren, "Strings." In Jenny F. So, ed. *Music in the Age of Confucius* (Washington DC: Freer Gallery of Art and Arthur M. Sackler Gallery / Seattle and London: University of Washington Press, 2000), 77, and 79.

² The visual sources of the Silk Road do not show music until the second century CE, although Chinese texts tell of Central Asian musicians being captured and brought to Gansu Province some centuries earlier (Liu Mau-tsai, "Kutscha und seine Beziehungen zu China von 2 Jh. v. bis zum 6 Jh.," *Asiatische Forschungen*, 27, 1969, 101 and 150-58).

String instruments have not survived from Shang, neither as extant objects nor images, but an Oracle Bone Graph may refer to them. This graph [𪛗; with the modern equivalent 樂 (*yue*)] means “music.” It has two components, an upper part that shows a pair of twisted silk threads and a lower one [𪛘; with the modern equivalent 木 (*mu*)] which means “tree” with the evolved meanings “wood” and “wooden.”³ Since silk strings are shown on top of a wooden body, the graph is thought to depict a string instrument. However, the shape of the Shang string instrument cannot be deduced. Specifically, we do not know if the quartet of zithers known during the Warring States period (*qin*, *se*, *zhu*, and *zheng*) had precursors that early. Since shapes changed strongly at this time, one cannot extrapolate backward from the fifth century shapes.⁴

Drums were prominent during the second millennium BCE and gained an even stronger presence during the first half of the first millennium. The *Shi jing* gives a glimpse *circa* 900 BCE:

There are blind drummers, there are blind drummers
In the court of Zhou.
Erecting stands, erecting racks
With high flanges and mounted wings.
The echo-drums, kettle-drums, suspended drums,
Little-drums, chimes, rattles, and clappers
Being ready then are played.
The pan-pipes and flutes are all raised:
Huang-huang, their sound.
Solemn and harmonizing the concordant sound.
The prior ancestors hear this.
Our guests arrive and stop,
Long viewing their performance.⁵

Four types of drums are mentioned. Although their design is poorly known, the semantic differentiation is remarkable. Beginning in the twelfth or eleventh century BCE, bells, too, were differentiated in size and arranged into tuned sets.⁶ Likewise, lithophones were sorted into graduated sets. With time, the sets became larger, culminating in the sets of 65 bells and 32 lithophones placed in the ritual chamber of Marquis Yi of Zeng's tomb in 433 BCE.⁷ Both sets hung from racks. Ensembles grew heavier between the late second millennium and the middle of the first millennium. At the same time light wind instruments remained. All were age-old Chinese inventions.

³ Tong Kin-woon. “Shang Musical Instruments.” Chapter 7: Stringed Instruments and Other Wooden Instruments. *Asian Music* 15.2, 1984, 68–70.

⁴ Lawergren, “The Metamorphosis of the *Qin*, 500 BCE–CE 500,” *Orientations*, May 2003, documents large changes of the *qin* between 500 BCE and 500 CE.

⁵ Edward L. Shaughnessy, “Western Zhou History,” in Michael Loewe and Edward L. Shaughnessy, eds. *Cambridge History of Ancient China: From the Origins of Civilization to 221 B.C.* (Cambridge: Cambridge University Press, 1999), 333.

⁶ Robert Bagley, “Percussion,” in Jenny F. So, ed. *Music in the Age of Confucius*, figure 2.19.

⁷ Lothar von Falkenhausen, *Suspended Music, Chime-bells in the Culture of Bronze-Age China* (Berkeley: University of California Press, 1993), 6 and 202.

By the eighth century zithers⁸ have differentiated into the *se* and *qin* mentioned in the *Shi jing*,⁹ and three centuries later the tomb of Marquis Yi (Zeng Hou Yi) contained another distinct type, the *zhu* (figure 2). Judging by the way the instruments were set up there, many large *se*-zithers would have taken part in an ensemble of ritual instruments centered around sets of bells and lithophones. The *qin* usually had more intimate associations, as can be seen already in Yi's tomb. Beside the *qin*, his coffin chamber contained few other instruments: three *se*-zithers, the *zhu*, a small flat drum, and two mouth-organs. One cannot know if they formed an ensemble, but all were quiet instruments and their sound is likely to have mixed well.

The relative composition of instruments began to shift as the first millennium progressed, and their properties changed. During the first half of the millennium, a bronze bell could produce two pitches, but this ability was lost at the end of the millennium.¹⁰ Gradually, fewer bells were cast, while chordophones became more numerous. Han reliefs show *se*-zithers at banquets and other occasions of entertainment. It was a shift away from heavy ritual ensembles, and it accelerated when the Silk Road became active at the beginning of our era. Its traffic brought light Western instruments into China. Various factors contributed to the decline of bronze bells, one being their difficult tuning process. Compared to the ease of tuning strings and winds, bronze bells were unwieldy.¹¹ As bronze bells declined, other vessels associated with the Zhou ancestral cult also did. Like them, bells lost their traditional place in the ritual.

When the Silk Road opened, China was ready to appreciate its musical potential. But up until then, China had stayed largely unaffected by foreign instruments. Later we will see that the *qin* was an exception.

2. The Western corpus of instruments

Within Western regions¹² instruments such as chordophones (figure 3) migrated easily and designs spread across wide regions. The process was helped by the frequent formation of empires which eased communication across large distances. Players and instruments circulated freely or as booty, gifts between rulers, etc.

Mesopotamia has left many images of instruments and texts about their musical

⁸ Formally, string instruments (chordophones) are divided into four types: harps, lyres, lutes, and zithers. Harps have a sound box with a thin sound board on one side. A thick rod protrudes from the box, and the strings run between the rod and the sound board. The strings form a plane perpendicular to the plane of the sound board. Lyres also have a sound box, but two arms protrude above it and a yoke connects them. The strings run between the yoke and the soundboard. The planes of the board and the strings are parallel. Ancient lutes have few strings and these hardly define a "plane of the strings." But each string is parallel with the sound board. There is a small sound box attached to a single rigid rod (the neck). Strings span the length of the rod. Zithers have a long and broad sound board, and strings run along it.

⁹ The *zhu* and *zheng*, not mentioned in the *Shi jing*, may have arisen somewhat later.

¹⁰ Falkenhausen, *Suspended Music*, 185, 189–90.

¹¹ Falkenhausen, *Suspended Music*, 323.

¹² Here "West" refers to Egypt, the Levant, Greece, Syria, Mesopotamia, and Iran. For arched harps of the first millennium BC, "West" means India (Lawergren, "The Spread of Harps Between the Near and Far East During the First Millennium A.D.: Evidence of Buddhist Musical Cultures on the Silk Road." *Silk Road Art and Archaeology* 4, 1995/96, 244).

and societal function. But for extant instruments we must turn to Egypt. Most of its instruments were lightweight, and its harps, lyres, and lutes had thin walls—just as modern European string instruments still have. Images of Mesopotamian instruments look similar to Egyptian ones, and we assume the instruments were equally light.

The first string instrument to appear was the harp, shown in Mesopotamia *circa* 3000 BCE and four centuries later in Egypt. The earliest harps were arched like hunters' bows and had a box-like resonator attached at the lower end. It had few strings, less than a half-dozen. Around 1900 BCE the vertical angular harp was introduced in Mesopotamia (figure 3a). The angular harp had a large number of strings,¹³ and we might view it as more "efficient" than the arched harp. The latter disappeared in the Near East, but remained in Egypt and seem to have migrated to—or been independently invented in—India (figure 3c). Vertical angular harps were light and portable and spread throughout the Near East, into Egypt and the Hellenistic world.

Lyres, too, emerged first in Mesopotamia, *circa* 2650 BCE. For the first three centuries they were large ("bull lyres"), about one meter high, but smaller ones (figures 3d and 3f) became standard after 2000 BCE. Although easily portable, lyres hardly spread east of Iran. At the time of the Silk Road, they had become closely identified with the Hellenistic culture of the West.¹⁴

Lutes arose about 2300 BCE in Mesopotamia, i.e., relatively late. They were light instruments with hardly anything beyond a stick, small resonator box, and a few strings. Compared to harps and lyres they were simple. Perhaps as a result, the social status of lutes remained low for millennia.

Many types of wind instruments were available in the West, and all were light. Their sound was soft—such as pan-pipes, and end-blown flutes—or loud—such as double reed pipes and trumpets. Between 2200 and 1800 BCE small (*circa* 10 cm long) and light trumpets flourished in the oasis sites north of Iran.¹⁵

Drums existed in several types, but they never dominated ensembles as in China. Most were small, but for a brief moment (2100–2000 BCE) a drum as tall as its player flourished in Mesopotamia.¹⁶

3. Silk Road Influences on Chinese instruments

The music of the Silk Road profoundly influenced China for most of the first millennium CE, but negative reactions surfaced at the beginning of the Song *circa* 960. Music theorists sought to revive the indigenous music played before the

¹³ Close to 20, known from extant harps in Egypt, see Lawergren, "Harfe," in Ludwig Finscher, ed. *Die Musik in Geschichte und Gegenwart* 4, 1996, 42–47; and "Counting Strings on Ancient Egyptian Chordophones," in Catherine Homo-Lechner and Annie Bélis, eds., *La pluridisciplinarité en archéologie musicale*. Paris: Editions de la Maison des Sciences de l'Homme, 1994), 519–33. In effect, vertical angular harps functioned as the "grand piano" of antiquity.

¹⁴ The single lyre image at Kizil (Lawergren, "The Spread of Harps Between the Near and Far East") is a straggler.

¹⁵ Lawergren 2003b ("Oxus Trumpets, ca. 2200–1800 BCE: Material Overview, Usage, Societal Role, and Catalog." *Iranica Antiqua* 38 [2003], 41–118).

¹⁶ Subhi Anwar Rashid, *Mesopotamien* (Leipzig: Volkseigener Betrieb Verlag, 1984), figures 49–55.

“corrupt” music of the West had reached China¹⁷ Although there was little agreement about the nature of that early music, several practices associated with Central Asian imports disappeared. Harps vanished from East Asia and some types of drum left China and migrated to Korean and Japan, as did large lute plectra.

The musical success of the Silk Road was partly due to its easy supply of light instruments. Another reason was religious. Mahâyâna sutras, which profoundly influenced the East, were written as if Western instruments were the norm. Moreover, sacred texts recounted the life of Siddhartha, the prince who would grow up to become the historical Buddha.¹⁸ Up to the age of 29 he had dwelled in his father’s palace and enjoyed the company of the female court musicians. He liked listening to their harps, lutes, flutes and drums.¹⁹ A still grander ensemble appears in the Lotus Sutra. It contains drums, horns, conch shells, pipes, flutes, zithers, harps, lutes, cymbals, and gongs,²⁰ an ensemble complement similar to that in figure 4. The sutra indicated that those who assemble such musicians would attain Buddhahood. Indeed, one gets the impression that Buddhist kings and princes were more attracted to the splendors of Siddhartha’s courtly life-style than his subsequent enlightened, but spartan, circumstance.

The sacred texts spelled out the delights of Paradise that awaited Buddhists. There would be “music, concerts, and musical instruments,” and worshipers would have access to an assortment of “materials, beginning with flowers and ending with musical instruments.”²¹ Since the music of Western instruments was a pleasure sanctioned for the after-life, why not enjoy it already here on Earth?

Western instruments and musicians arrived along the two Silk Road branches that ran north and south of the Tarim basin. They left behind numerous painted scenes, some of musical subjects. Chinese pilgrims traveled the opposite direction to India and described the music they encountered. Instruments were brought out on Buddhist festivals. In 630 CE Xuanzang visited Kucha (Qiuci) on the northern road.

The soil is suitable for rice and corn... it produces grapes, pomegranates, and numerous species of plumes, pears, peaches, and almonds, also grow here. The ground is rich in minerals – gold, copper, iron, and lead, and tin. The air is soft, and the manners of the people honest. The style of writing [literature] is Indian, with some differences. They excel over other countries in their skill in playing the lute and pipe. They clothe themselves with ornamental garments of silk and embroidery.²²

¹⁷ Rulan Chao Pian, *Song Dynasty Musical Sources and Their Interpretation* (Cambridge, Mass.: Harvard University Press, 1967), 1.

¹⁸ For the role of music in Buddha’s life, see Lawergren, “Buddha as a Musician.” *Artibus Asiae* 54 (1994), 226–40.

¹⁹ E.B. Cowell, *Buddhist Mahâyâna Texts. The Buddha-karita of Asvaghosha* (New York: Dover, 1969), 56–7.

²⁰ Burton Watson (trans.), *The Lotus Sutra* (New York: Columbia University Press, 1993), chapter 2, 40.

²¹ F. Max Müller (trans.), *Buddhist Mahâyâna Texts. The Larger Sukhâvati-vyûha* (New York: Dover, 1969), 53.

²² Samuel Beal, (trans.), *Si-yu-ki, Buddhist Records of the Western World, by Hiuen Tsiang* (Delhi: Oriental Books Reprint Corp., 1969), 19.

Lutes began arriving in China during the second century CE,²³ but no extant examples exist from that time. Most likely, they were light instruments with thin sound boards.²⁴ Such a light instrument must have come as a surprise to Chinese musicians whose zithers had thick walls. Lutes came in various shapes—round, pear-shaped, and waisted—and held four or five strings. Harps are shown in China from the third century CE. They were either arched (arriving from India, figure 3c) or angular (from Iran and points further West, figure 3a). A few centuries later angular harps became ubiquitous in Chinese ensembles.²⁵

B. The earliest *qin*

The first example of a *qin* (figure 2a) appeared in the period considered devoid of Western musical influences (433 BCE). Some have asserted that even earlier precursors had arisen already during Shang,²⁶ but there is no proof. By the time of the Eastern Han the idea had taken hold that Confucius had played it in the sixth century BCE, but the only evidence for it earlier than 433 BCE is provided by *Shi jing* which mentions the *qin* and *se* played at banquets, convivial gatherings, dances, and sacrificial rites.

A few centuries after Zeng Hou Yi the *qin* had acquired such esteem that chroniclers felt compelled to invent fancy pedigrees for it and ascribe mythical heroes like Fu Xi, Shen Nong, and Shun as its inventors.²⁷ It also gained a place in moral discourse with the story of the *qin* player Boya. According to the *Lüshi chunqiu*²⁸ he roamed the Tai mountains of Shandong with his boon companion Zhong Ziqi.

Whenever Boya played the *qin*, Zhong Ziqi would listen to him. Once, when he was playing the *qin*, his thoughts turned to Mount Tai. Zhong Ziqi said, "How splendidly you play the *qin*! Lofty and majestic like Mount Tai." A short time later, when his thoughts turned to rolling waters, Zhong Ziqi said, "How splendidly you play the *qin*! Rolling and swelling like a rushing river." When Zhong Ziqi died, Boya smashed the *qin* and cut its strings. To the end of his life, he never again played the *qin* again because he felt that there was no one in the world worth playing for. This applies not only to the *qin*, but to worthiness as well. Although a man is worthy, if he is not received by a ruler with due courtesy, why should he devote his full loyalty to him? It is like the fleet-footed horse that will not go a thousand *li* by itself when the driver is not skilled.²⁹

²³ Laurence Picken, "The Origin of the Short Lute," *Galpin Society Journal*, 1955, 34.

²⁴ Those in the West were light and had thin sound boards, e.g., the Coptic lute in the Metropolitan Museum of Art, third–ninth century CE (Ricardo Eichmann, *Koptische Lauten; Eine musikarchäologische Untersuchung von sieben Langhalslauten des 3.–9. Jh. n. Chr. aus Ägypten* [Mainz am Rhein: Zabern, 1994], 90–1, plates 19–22) has a sound board 1.5 mm thick.

²⁵ Lawergren, "The Spread of Harps Between the Near and Far East," 270.

²⁶ R.H. van Gulik, *The Lore of the Chinese Lute; An Essay in the Ideology of the Ch'in* (Tokyo: Sophia University and Tokyo/Rutland: Charles E. Tuttle Co., 1969 [1940]), 6; James C.Y. Watt, "The Qin and the Chinese Literati," *Orientalism*, November 1981, 44.

²⁷ Gulik, *The Lore of the Chinese Lute*, 6.

²⁸ Circa 235 BCE.

²⁹ John Knoblock and Jeffrey Riegel, *The Annals of Lü Buwei* (Stanford: Stanford University Press, 2000), 308. They render *qin* as lute, but I have restored the original. Unfortunately, the great connoisseur of Chinese music Gulik (*The Lore of the Chinese Lute*, 1969 [1940]) provided the bad precedence in 1940. It would benefit studies if translators include the source's musical terminology as well as its English equivalent.

The story became a popular subject on bronze mirrors during the Han period (figure 5, and the series of illustrations in Lawergren 2003a, figure 1) and in the Six dynasties periods.³⁰ It drew attention to the expressive power of the *qin*, and the rewards of perceptive listening. This, perhaps, made it a favorite of recluses and literati. A millennium later, with the exclusive appeal of the *qin* intact, it had become more of a symbol than a musical instrument. Hanging on walls, it decorated studios of many literati, even those unable to play it.³¹

When the extant *qin* of Zeng Hou Yi was recovered in 1977, the exploration of the early history could be put on a factual basis. But the tomb contained much remarkable information on bells, and for decades the significance of the *qin* was overlooked.

1. The shape of the *qin*

Three surviving ancient *qin*-zithers are shown in figure 6, and that of Marquis Yi's is typical in dimensions and construction. Compared to the *se* (figure 7) it is much more compact. Whereas the *se* sound box is made from separate pieces of thin wood, the *qin* body is carved from a single thick piece. Its center is scooped out to form a cavity, but the walls are left thick (nearly 5 cm).³² The outer surface curves smoothly in all three dimensions. The cavity is covered by a separate bottom plate about two centimeters thick. The silhouette of the *qin* visibly separates it into a stout sound box and a narrow neck. Ten strings, tied to an anchor under the neck, emerge at the top of the neck, stretch across the body, and pass over a wide bridge where they descend through holes into the box and terminate at the tuning pegs accessible through a D-shaped opening (figure 6a, bottom) from the underside. Because the pegs serve to fine-tune the instrument, there is no need for movable bridges.

The other excavated examples³³ in figure 6 come from fifth through second century contexts in the Chu territory of south-central China. This does not reflect their actual distribution in ancient China, but merely indicates the regions where tomb constructions and/or soil and climate conditions favored the survival of objects made of wood. The number of strings on the ancient *qin*-zithers varies slightly, but the most common is seven, the same as on the classical *qin*. These three traits—the string counts, the thick soundboards, and the use of tuning pegs—indicate that these ancient instruments are ancestors of the later classical *qin* (figure 6d).

There are, however, noteworthy differences between the ancient and the

³⁰ Suzanne Cahill, "Boya Plays the Zither: Two Types of Chinese Bronze Mirror in the Donald H. Graham Jr. Collection," in Toru Nakano, *Bronze Mirrors From Ancient China; Donald H. Graham Jr. Collection* (Honolulu: Donald H. Graham Jr., 1994), 56. As in this figure, Han mirrors often show two companions on either side of Boya. Cahill suggests they illustrate the two facets of the Zhong Ziqi character, one hearing Mount Tai, the other a rushing river.

³¹ Watt, "The Qin and the Chinese Literati," 46.

³² Cf. the hefty wall thickness of the classical *qin*, circa 3.2 cm.

³³ The first was found 1973 in tomb 3 at Mawangdui (Li Chunyi, *Zhongguo shanggu chutu yueqi zonglun* (Beijing: Wenwu, 1996), 452, figure 268).

classical *qin*.³⁴ The former is smaller, only 67–82 centimeters long compared to the classical *qin*'s span of 120 centimeters. The shape is different: the classical *qin* is basically trapezoidal with the narrow end on the player's left; the ancient *qin* has a broad box on the right and a narrow neck on the left. During the 800 years following Zeng Hou Yi, the *qin* transformed smoothly from the short and stubby model to the long and curvaceous still played today.³⁵ Various new features arose in that period. The 13 small markers (*hui*) that now indicate finger positions were absent on the earliest ancient *qin*-zithers, but are mentioned in the *Huainan Zi*³⁶ compiled mid-second century BCE.³⁷

The ancient *qin*-zithers, while internally consistent, differ from most other ancient Eastern zithers, all which were close to a parallelepiped in shape. As already stated, China had three types: *se*, *zhu*, and *zheng*-zithers (figures 7 and 2). The *se* was most prominent—both in size, usage, and archaeological survival—but it largely disappeared after 300 CE.³⁸ It had no pegs, but was tuned by adjusting narrow movable bridges, one under each string. The same method was used on all zithers except the *qin*. The *se*-zithers of Zeng Hou Yi were long (167 cm) and had 25 strings. There were 12 identical *se*-zithers,³⁹ most of them in a ritual chamber with the set of 65 bells. Had they all played concurrently, the band would probably have held its own against the sound of the grand set of heavy bells.

Several examples of the *zhu* and *zheng* have also survived from the fifth century BCE. Like the *se*, the *zhu* did not last long beyond Han, but the *zheng* is still played today. The *zhu* also had a neck-and-body structure, but it was less prominent than on the *qin*. It was played in a different way: the player sat at the narrow end of the *zhu*, faced down the length axis of the instrument, and struck the strings by a short stick in the right hand.⁴⁰ During the Qin and Han dynasties the instrument gained notoriety. Two incidents were occasioned by the founding emperor's love of *zhu*-music and song. The first emperor of Qin had summoned the extraordinary player Gao Jianli to appear before him and play. But a courtier recognized Gao as a hunted assassin.

The emperor, unable to bring himself to kill such a skilled musician, ordered his eyes put out and commanded him to play in his presence. The emperor never failed to praise his playing and gradually allowed him to come nearer and nearer. Gao Jianli then got a heavy piece of lead and fastened it inside his *zhu*, and the

³⁴ The classical *qin* was profoundly examined by Gulik, *The Lore of the Chinese Lute*. For a more recent presentation, see *Wenwu tianqi* 2004.1, 4–33.

³⁵ Lawergren, "The Metamorphosis of the *Qin*," 37.

³⁶ *A Concordance to the Huainanzi* (Hong Kong: Commercial Press, 1992), chapter 19, 206, lines 16–17.

³⁷ The markers are mentioned in a story about a blind person who cannot tell day and night apart, but plays the *qin* without missing a string or *hui*. The translation by Le Blanc and Mathieu (*Philosophes Taoistes, II: Huainan Zi* [Paris: Gallimard, 2003]), 926 is unclear on this point.

³⁸ A late depiction is in Boston (Wu Tung, *Earth Transformed; Chinese Ceramics in the Museum of Fine Arts, Boston* [Boston: MFA, 2001]), 16–17, "Granary with Figures and Architecture." Late third century).

³⁹ The first ones removed from the tomb dried up and disintegrated, but a technique was found to preserve about six *se*, two of them in splendid condition.

⁴⁰ Two such sticks were apparently excavated over a decade ago (see Lawergren, "Strings," note 45), but they remain unpublished.

next time he was summoned to play at the emperor's side, he raised the *zhu* and struck at the emperor. He missed, and was summarily executed.⁴¹

Since the episode was written around 100 BCE, only a century after the attempt, it may be fairly accurate. Illustrations occurred centuries later, e.g., on a relief in the Wu Liang shrine,⁴² but the artist rendered the *zhu* as a narrow rectangle without a neck. Either he was ignorant of the instrument, or it had changed or vanished at this late date. Today we know the shape of the *zhu* and realize it looks like a 1.5 meter long club. Loaded with a lump of lead, it could have been a lethal weapon.

The second episode concerns the first emperor of Han, Gaozu (Liu Bang), who grew up in the territory of Chu. In 196, while traveling to the capital of Chang'an.

He was passing through his old home of Pei on his way. Here he stopped and held a feast at the Palace of Pei, summoning all his friends and the elders and young men to drink to their hearts' content. He gathered together a group of some hundred and twenty children of Pei and taught them to sing and, when the feast was at its height, Gaozu struck the *zhu* and sang a song which he had composed:

A great wind came forth;
The clouds rose on high.
Now that my might rules all within the seas,
I have returned to my old village.
Where shall I find brave men
To guard the four corners of my land?

He made the children join in and repeat the song, while he rose and danced. Deeply moved with grief and nostalgia, and with tears streaming down his face, he said to the elders of Pei: "The traveler sighs for his old home?"⁴³

In both instances the *zhu* is played by soldiers, men who probably had little in common with the recluses who favored the *qin*. It seems to have been a folk-instrument played by soldiers and men of action.

Four *zheng*-zithers have been excavated, all from Southeast China.⁴⁴ They are nearly identical to known examples of *zheng* depicted more than a millennium later, and there is little room for misidentification. The fifth-century date is surprising because the *Shi ji* states it was invented in the Qin state of northeast China during the third century BCE.⁴⁵ Evidently, this text is not always reliable on musical affairs.

Figure 8 brings in the earliest string instruments found in Japan and Korea. All are zithers. The *wagon* dominated Japan, with the first excavated examples from the

⁴¹ *Shi Ji*, 2537; translation in Burton Watson, *Records of the Historian; Chapters from the Shih chi of Ssu-ma Ch'ien* (New York: Columbia University Press, 1969), 66.

⁴² 151 CE (Wu Hung, *The Wu Liang Shrine; The Ideology of Early Chinese Pictorial Art* [Stanford: Stanford University Press, 1989]), 324–27.

⁴³ Watson, trans., *Records of the Historian*, 140–1.

⁴⁴ Lawergren, "Strings," 66, 80–83.

⁴⁵ Han Mei, "Zheng," in *The New Grove Dictionary of Music and Musicians*, Vol. 27 (London: Macmillan, 2001), 803.

northern parts of Honshu island during the Jomon period (500–300 BCE).⁴⁶ They were about 55 cm long and had space for two strings. Subsequent examples (300–100 BCE) appeared in more southerly regions. Still later (during the Kofun period, 300–710 CE) the instrument grew as large as 1.5 meter and held six strings.⁴⁷ Since then the *wagon* has largely disappeared, although an altered version is still played at traditional events. The *koto*, which has succeeded it as the zither characteristic of Japan, is generally assumed to be related to the Chinese *zheng* rather than the *wagon*.⁴⁸

The earliest instrument in Korea was recently excavated at Sinchang-dong, Gwangju, South Korea. It is dated between 100 BCE and 100 CE.⁴⁹ It is a wooden board shaped like a rectangle joined to a semicircle. The latter has a small bracket that probably supported a narrow curved piece, now missing. This complex shape is reminiscent of the current Korean *Gayageum*,⁵⁰ a 12-stringed zither with a curved piece called “ram’s horns.” Two other Korean/Manchurian instruments, dated to the fifth-century CE, are shown in a tomb situated near the Yalu river.⁵¹ One has completely rectangular shape and carries five transverse tuning pegs at one end. Identical instruments have survived in Japan from the ninth century,⁵² but its ancient name is not known, neither there nor in Korea. The other is a zither with frets instead of pegs, a feature which indicates it is the predecessor of the *Geomungo*, currently a 6-stringed Korean zither. Figure 9 gives photos of the instruments in the previous figure. The earliest Japanese *wagons* were only thin wooden boards; later ones are boxes. In fact, all known ancient Eastern zithers, except the *qin* and *zhu*, have near-rectangular shape when viewed from above. We take it to be a genuine feature of early Eastern zithers. The narrow compass of forms becomes even more conspicuous when we consider the great variety of string instruments available contemporaneously in the West (figure 3).

What caused this similarity across the vast Far Eastern region is not known, but

⁴⁶ David W. Hughes, “Music Archaeology of Japan: Data and Interpretation,” in Ellen Hickmann and David W. Hughes, eds. *The Archaeology of Early Music Cultures* (Bonn: Verlag für systematische Musikwissenschaft, 1988), 63–66; Hirata Tsutomu, *The Koto, Technetics and Industry* (Osaka: Osaka University Graduate School of Letters, 2002); Wada Katsuhisa, “The Early History of the Zither *Wagon*,” *Nihon Dentoo Ongaku Kenkyuu* (Bulletin of the Research Centre for Japanese Traditional Music, Kyoto City University of Arts) 1, 2004, 75–85.

⁴⁷ The Shōsōin Imperial Repository, Nara, has seven *wagons* from the eighth or ninth century. All have six strings (Hayashi Kenzō et al., *Shōsōin no Gakki* [Tokyo: Nihon Keizai Shimbun Sha, 1967], 33–35, 80, plates 68–92).

⁴⁸ David W. Hughes, “Music Archaeology of Japan: Data and Interpretation,” 80.

⁴⁹ Cho Hyunjong et al., *Gwangju shinchangdong jeoseupjee yoojuk IV* (Sinchang-dong wetland site IV). Report on the Research of Antiquities of the Gwangju National Museum, vol. 45 (Gwangju, Korea: Kooklip Gwangju Bakmoolkwan, 2002), 17–18, 133, 141, and 151. A replica of the zither is displayed in the National Museum of Korea, Seoul.

⁵⁰ Twelve-stringed examples were deposited in the Shōsōin Imperial Repository, Nara, Japan at the end of the first millennium CE (Hayashi et al. *Shōsōin no Gakki*, 78 and 79).

⁵¹ Tomb 1, Changchuan, Qi-an, Jiling, on the North Korean-Manchurian border. Both paintings are reproduced in Song Bang-song, *Korean Music; Historical and Other Aspects* (Seoul/Somerset [New Jersey, USA]: Jimoondang International, 2000), 142–45. Several rectangular zithers of similar age and design are given by Song Bang-song, *The Sanjo Tradition of Korean Komun'go Music* (Seoul: Jung Eum Sa, 1986), figures 1–11.

⁵² A 7-stringed example, 120 cm long, is in the Shōsōin (Hayashi et al. *Shōsōin no Gakki*, 21, 75, and plates 38–41).

some sort of common origin seems likely. Equally remarkable is the stark difference between these rectangles and the neck-and-body shape of the *qin*. The feature sets the *qin* apart from Eastern zithers in general. Since a clear separation between a neck and a body can be found on Western chordophones, they are likely to have provided the inspiration.

Steppe harps influencing the shape of ancient *qin*-zithers

The neck-and-body would normally bring lutes to mind, but lutes did not enter China until the Silk Road was established five centuries after Zeng Hou Yi. Before the era of the Silk Road they existed only in regions west of Iran and Bactria (figure 10a),⁵³ and any impact on China is unlikely. The most plausible source was instead an unusual instrument which possessed the required neck-and-body structure and existed in abundance on China's western border: the horizontal angular harp. It has recently been found in tombs associated with "mummy" burials in Xinjiang Autonomous Region.⁵⁴ Five years ago when I pondered foreign influences, the first such harps were barely published, and one could only hint at the connection.⁵⁵ Now the harps appear to have been common in that western region (figure 10b) during the first millennium BCE.

The two first harps were excavated 1996 in cemetery number 1 located near the oasis of Zughunluq, Qiemo county, Xinjiang.⁵⁶ The site lies on the southern route around the Taklamakan desert, near the Gobi desert, and the dry sand had preserved the complete wooden parts of the harp and some of the leather cover (figures 11a and 11b). They belong to period II, cautiously dated to 770 BCE–8 CE, but were probably buried between the fifth or fourth centuries BCE. In 2003 similar harps were found in a cemetery on the route north of the Tarim, at Yanghai, Shanshan county, Xinjiang (figure 11c).⁵⁷ The harps from the two sites in Xinjiang (figure 10b) are closely related to three more distant harps which have long been known and documented. One was found in a tomb at Pazyryk in the Altai mountains, the other at nearby Bashadar,⁵⁸ and the third was collected at Olbia on the Black Sea (figures

⁵³ E.g., F.M. Karomatov et al., *Mittelasien* (Leipzig: Volkseigener Betrieb (VEB) Verlag, 1987), figures 49 and 82.

⁵⁴ For a discussion of Tarim mummies, see J.P. Mallory and Victor H. Mair, *The Tarim Mummies; Ancient China and the Mystery of the Earliest Peoples from the West* (London: Thames and Hudson, 2000).

⁵⁵ Lawergren, "Strings," 75.

⁵⁶ In grave M14: Wang Bo et al., "The no. 1 cemetery at Zhaghunluk (Jaganluq), Jumo, Xinjiang," *China Archaeology and Art Digest* 2000.3 (4), 431–35; Wang Zichu, "Reconstruction of Konghou," *Wenwu* 1999.7, 60; see too the reports in the journals *Xiyu yanjiu* 2001.2, 78–85; *Kaogu xuebao* 2003.1, 89–136, figure 25; and in *Wenwu* 2003.2, 56–62.

⁵⁷ *Kaogu* 2004.5, 3–7, figure 9; *Wenwu tiandi* 2004.6, 60.

⁵⁸ Bo Lawergren, "The Ancient Harp from Pazyryk," *Beiträge zur allgemeinen und vergleichenden Archäologie* 9/10, 1990, 111–18. The Yanghai and Pazyryk harps both had five strings made from animal sinew, possibly taken from the back of a deer. The procedure of building long strings by joining overlapping pieces of sinew is well attested in the ethnographic literature both in the north (e.g., in Greenland, Gudmund Hatt, *Arktiske skinddragter i Eurasien og Amerika, en etnografisk studie* [Copenhagen: J.H. Schultz, 1914], 41–43) and in the south (e.g., in the Kalahari desert, see Marjorie Shostak, *Nisa. The Life and Words of a !Kung Woman* [Cambridge, Mass.: Harvard University Press, 2000], 13). To make a string, thin segments are pulled from a dried piece of tendon, and they are shaped between the string-maker's teeth. The saliva acts as glue. The strings are joined by rolling them along the cheek or thigh. The process leaves marks on the front teeth which can be archaeologically detected (Hart Hansen et al., *The Greenland Mummies* [London: British Museum, 1991], 83).

11f and 11e).⁵⁹ All are horizontal angular harps. These three harps have rounded sound-boxes that span the full length of the instrument. But on the Xinjiang harps the box occupies only half the length of the instrument, and the rest is a narrow horizontal neck. A short rod protrudes vertically from the distal end of the neck. At Pazyryk and Bashadar, however, the vertical rod had the shape of an inverted T. It was made from a tree branch and tied to the top of the instrument. Some boxes are narrower in the middle than at the ends, i.e., they are waisted. Most harps had about five strings.⁶⁰ Since all these harps were buried at the edge of the vast Eurasian steppe zone (figure 10b), I call them “steppe harps.”

Similar⁶¹ horizontal angular harps were depicted on walls of Assyrian palaces between 850 and 650 BCE (figure 11d).⁶² The extent of the Assyrian empire ca. 830 BCE is given in figure 10b.⁶³ As already discussed, angular harps—horizontal as well as vertical—had arisen a millennium earlier in the Old Babylonian period (figure 3b). Assyria harps descended from those, as did horizontal harps found at Shar-i Sokhta⁶⁴ and in the Oxus region;⁶⁵ which both date to about 2000 BCE. The Assyrian version had vertical rods with human hands carved at the top. Perhaps birds carved on steppe harps (figure 11d) echoed that practice.

The edge of the steppe touched the Assyrian empire and some steppe people (e.g., the Scythians) entered Assyrian territory to join the army as mercenaries.⁶⁶ The recruitment was brisk during the latter half the seventh century, a period when we know the shape of Assyrian harps (figure 11d). Its small size and low weight was well suited to life on the steppes. Riders could play them on horseback and carry them far. In the process it seems plausible that the Assyrian harp transformed into the steppe harp (figures 11a–11c, 11e–11f) during the course of a few centuries. The steppe harps flourished before Buddhism had entered East Asia. They were not associated with Buddhism, nor did they appear on Silk Road paintings.

The strings are tied between the vertical rod and a long horizontal stick (figures

⁵⁹ Werner Bachmann, “Die skythisch-samartische Harfe aus Olbia: Vorbericht zur Rekonstruktion eines unveröffentlichten, im Kriege verschollenen Musikinstruments,” In Marcel Otte, ed. *Sons origines: Préhistoire de la musique. Actes du colloque de musicologie, 11–12–13 décembre 1992* (Liège: Université de Liège, 1994).

⁶⁰ A harp found at Bashadar (near Pazyryk) may have had 15 strings (Lawergren, “The Ancient Harp from Pazyryk,” 115), but one of the Xinjiang harps seems to have had only 3 (Wang Bo, private information).

⁶¹ They have many obvious features in common, but a more subtle one is the shape of the sound hole. The harps from Zughunluq and Pazyryk have holes shaped like rectangles with concave sides. That was also the shape on Assyrian harps (Bo Lawergren and O.R. Gurney, “Sound Holes and Geometrical Figures: Clues to the Terminology of Ancient Mesopotamian Harps,” *Iraq* 49, 1987, 37–52, figure 6 and plate Xa).

⁶² Mostly with 9 strings (Lawergren and Gurney, “Sound Holes and Geometrical Figures, 51). The image comes from the Nimrud palace of Ashurnasirpal II dated 865–860 BCE, but harps drawn two centuries later in Ashurbanipal’s palace at Nineveh look similar (Rashid, *Mesopotamien*, figures 137 and 146).

⁶³ Map in Michael Roaf, *Cultural Atlas of Mesopotamia and the Ancient Near East* (Oxford: Facts on File, 1990), 164.

⁶⁴ Lawergren, “Harfe,” figure 3b.

⁶⁵ Henri-Paul Francfort, “Gobelet cylindrique avec scène de banquet,” in Osmund Bopearachchi et al, eds., *Catalogue de l'exposition de l'Indus à l'Oxus. Archéologie de l'Asie Centrale* [Lattes: Association IMAGO—Musée de Lattes, 2003], 43–44, figure 12a.

⁶⁶ Georges Roux, *Ancient Iraq* (Harmondsworth: Penguin, 1964), 315.

11d and 11f),⁶⁷ and the latter rested in close contact with the skin that covered the sound box. Collars would have been wound around the rod⁶⁸ and string attached as shown in figures 11a and 11d. By turning the collars, string tension was adjusted and pitch regulated. This was an old tuning technique, probably present already on the first harps in 3,000 BCE.⁶⁹ Soon after, intricately plaited collars appeared on a bull-lyre in Mesopotamia, 2450 BCE (figure 12).⁷⁰

It seems that Assyrian horizontal harps gave rise to harps played in the vast steppe region.⁷¹ Some had symmetrical bodies, but those in the Xinjiang region were asymmetrical. Half their bodies were slim like necks, the other half looked like a body with sloping shoulders. This structure is reminiscent of the ancient *qin*. Moreover, the playing position is horizontal for both instruments. Most likely, the harp inspired the shape of the *qin*. That influence played out over a relatively small space and brief time: in Xinjiang during the first half of the first millennium BCE.

2. Tuning keys

The easiest passage from Xinjiang into China leads through the Gansu corridor. Several other attributes of the *qin* also point in that direction. One concerns the tuning of the *qin*, specifically its tuning pegs and tuning keys. Each string required a peg and, since the ancient instrument was smaller than the classical one, the spacing between pegs became denser. Classical pegs can be turned by fingers, but the high density of pegs on the ancient *qin* demands the use of narrow keys.⁷² Many have survived because they were made of bronze. For a long time their function was not recognized, but the 1983 excavation of Nanyue Wang finally enabled a proper identification. The key is known as a *zhen yao*.⁷³ Most were decorated with animal-style images characteristic of China's northern zone and the steppes of Central Asia.⁷⁴

⁶⁷ The Pazyryk harp had such a stick. However, it was not reported on the Zaghunluq harps (note 56), but excavation photos show stick-like pieces in the vicinity (private communication from the excavator Wang Bo). At Yanghai (see note 56) at least one harp has such a stick inserted into the skin (figure 11c) which also touched a number of perpendicular sticks inserted between the sides of the sound box. These acted as spacers, preventing the collapse of the box when the skin dried and tightened. Similar spacers are documented on the Pazyryk harp (Lawergren, "The Ancient Harp from Pazyryk," 112).

⁶⁸ Collars made of leather straps survive on the Pazyryk harp (Karamatov et al., *Mittelasien*, plate 32; Lawergren, "The Ancient Harp from Pazyryk," 115, plate 57.1).

⁶⁹ Lawergren, "To Tune a String: Dichotomies and Diffusions between the Near and Far East," in Börje Magnusson et al., eds. *Ultra Terminum Vagari. Scritti in onore di Carl Nylander* (Rome: Edizioni Quasar, 1997), 180.

⁷⁰ Lawergren, "To Tune a String," figure 17b.

⁷¹ But steppe harps were made locally of *huyang* timber (Wang et al., "The no. 1 cemetery at Zhaghunluk (Jaganluq), Jumo, Xinjiang," 434).

⁷² All known keys are dated before the end of Western Han. Presumably, pegs were turned by fingers thereafter.

⁷³ Guangzhoushi wenwu guanli weiyuanhui & Guangdong sheng bewuguan, eds., *Xi Han Nanyue wang mu* (Beijing: Wenwu, 1991), volume 1, 92–93, and volume 2, pl. XLVII; Emma C. Bunker et al., *Ancient Bronzes of the Eastern Eurasian Steppes from the Arthur M. Sackler Collections* (New York: The Arthur M. Sackler Foundation, 1997), 293.

⁷⁴ E.g., Bunker et al., *Ancient Bronzes of the Eastern Eurasian Steppe*, 113–299.

The pegs of Maquis Yi's *qin* were found near the sound box (figures 2 and 6a). They were wooden tubes where one end had been provided with a ridge that fit a key with square socket (figure 13a). Nearly three centuries later the Mawangdui pegs were made of bone and given octagonal cross section. There is a central channel and a side hole (figure 13b). Nanyue Wang had eleven bronze pegs with square cross section (figure 13c). The side hole remained, but the key had a waist, presumably to accommodate a cord encircling the peg—as is the custom today.

Keys consisted of a socket, shaft, and handle. The socket had a square cavity that fit square pegs, and the handle was elaborately decorated. Tuning keys made before the third century BCE usually had long square shafts (figures 14a–14i), but later ones often had circular ones (figures 14k, 14n, 14o, and 14q). Some of the keys in figure 14 have been published earlier,⁷⁵ but eight are new.⁷⁶ Unfortunately, many come from antiquities markets and are less trustworthy than properly documented ones.

The animals shown on the handles were common in China's Northern Zone and Central Asia, but less so on the Central Plain. Although the keys were used on *qin*-zithers in central Chinese regions, their decorative repertoire had originated in distant regions in the north and northeast. Two of the keys (figures 14h and 14i) have even further antecedents. They depict goat-men with bodies of goats and heads of men, and such hybrids were characteristic of Achaemenid art of the Persian empire. Persepolis, its capital, lies 5,000 km to the west.

Northern and Central Asian bronzes commonly show ferocious battles, and tuning keys are no exception. The most explicit battle occurs on the oldest key (figure 14a). A feline rules the top section and bites the head of a long snake curling underneath. At the same time, a large bird attacks the rear end of the feline, its sharp beak hacking away at the anal region. The bird is covered by a mass of feathers and encircled by the snake. Eloquently produced as this scene is, it is hard to see how it relates to the *qin* or its music.

The goat keys (figures 14c and 14d) were made about 50 years later. Both animals rest peacefully, as do the monkey and bear in figures 14f, 14e, and 14p. But the raptor (14g) is in the ferocious style of the northern steppe: the large bird has grabbed a small bear cub in its sharp talons. A slightly later key shows the violent combat of two animals (14k): a standing bird curves sharply back onto itself and bites the rear feathers of its own body. At the same time the bird is attacked by a small feline that clutches the inner curve of the bird's body. Several other keys have animals with acrobatically curved bodies, postures that permit the animals to bite themselves (14m and 14n). But there are also gentler scenes, such as two monkeys caressing (14j), and wrestlers engaging in a playful tussle (14l). Perhaps they are acrobats like the man on an earlier key (14b).

A number of keys show bears. Normally, their top surface (dorsum) is unbroken, but in figure 14p the surface has a rectangular opening which contains a lever that turns around an axis. The cross-section of the small lever is an isosceles triangle with

⁷⁵ Lawergren, "The Metamorphosis of the *Qin*," figure 5.

⁷⁶ For photographs of keys, see Lawergren, forthcoming ("Iconography of the Ancient Chinese *Qin* Zither [500 BC to 500 AD]," *Music in Art* 29, to be published 2005).

a fairly sharp edge at the inner corner. Most likely, it is a knife for cutting the playing string.⁷⁷ It is a folding knife, i.e., a flick-knife.

The image of an acrobat on a key, accords with the role of music known elsewhere: Han reliefs show acrobats at musical performances.⁷⁸ But the majority of keys have steppe motifs, and they seem unlikely to relate to music. Instead, they point to an affinity between the *qin* and the environment of northern China and Central Asia where such motifs flourished.⁷⁹

Most keys are made of bronze. The exceptions were produced during Western Han, a time when the vogue for key-making was coming to an end. One key is made of solid silver inlaid with precious stones (14p), and the other is solid bronze inlaid with gold and precious stones (14q). Both are elite objects which point to the high status bestowed on the *qin* at this late date. There is also an iron key in the tomb of Princess Dou Wan at Macheng, Hebei (see below).

Made of perishable material, most *qin*-zithers have perished from the archaeological record, but their bronze pegs and keys survive and leave clues to the spatial and temporal distribution of the instrument. An inventory of excavated keys would give insight into this important information,⁸⁰ but it is a difficult task since much of the material may be unreported.⁸¹ On the basis of this study one would expect the earliest keys to come from northern China. To date only a handful of keys have been identified in scientific excavations and few are earlier than Han. In the following partial list, six come from sites in northern China, and the seventh from the south. Number eight is made from iron inlaid with gold, all the others from bronze.

1. Luoyang city, Henan Province. Late sixth to early fifth century BCE.⁸²
2. Fenshuiling, Changzhi county, Shanxi Province. Fifth century BCE (figure 14d).
3. Jincun, Luoyang, Henan. Fourth century BCE (figure 14f).
4. Jishang, Woyang, Anhui (80 km west of Hefei). Western Han (similar to figure 14n).⁸³

⁷⁷ A similar bear with flick-knife is illustrated in Emma C. Bunker et al, *Nomadic Art of the Eastern Eurasian Steppes; The Eugene V. Thaw and Other New York collections* (New York: The Metropolitan Museum of Art; New Haven: Yale University Press, 2002), 187.

⁷⁸ E.g., Lucy Lim, *Stories from China's Past* (San Francisco: The Chinese Culture Foundation, 1987), plate 48, which shows jugglers with two musicians playing pan-pipes; Zhou Dao et al., *Henan Han dai huaxiangzhuan* (Shanghai: Shanghai Renmin Meishu, 1985), figure 243, which has an archer, a juggler, and dancer with three musicians playing the *zhu*-zither, drum, and mouth-organ.

⁷⁹ For convenient archaeological discussions of the Northern Zone, see Kathryn M. Linduff, "An Archaeological Overview," in Emma C. Bunker, *Ancient Bronzes of the Eastern Eurasian Steppes from the Arthur M. Sackler Collections* (New York: The Arthur M. Sackler Foundation, 1997); Nicola Di Cosmo, "The Northern Frontier in Pre-Imperial China," in Loewe and Shaughnessy 1999, 885–966.

⁸⁰ Keys in Western collections usually come from plundered sites and cannot be used.

⁸¹ Since the function of the keys has only recently become known, they may lie misidentified in Chinese museums. One example is the key shown as figure 14d. It was only discovered after Li Xiating and Zhang Deguang learned about the identification in Washington and looked in storage rooms at their home institution, Shanxi Institute of Archaeology (Lawergren, "Strings," n. 34).

⁸² *Wenwu* 2003.12, 12–28, figure 9. The report dates it roughly to Eastern Zhou, but a bronze statuette in the same tomb is similar in shape, size, and decoration to the quadruped in Jenny F. So, *Eastern Zhou Ritual Bronzes from the Arthur M. Sackler Collections* (New York: The Arthur M. Sackler Foundation, 1995), figure 46, and I assign it the same date. For items 1, 2, and 6, see also Lawergren, "Strings," figures 3.9.3.b, 3.9.3.c, and 3.9.3.g.

⁸³ See the report in *Wenwu* 2003.9, 25–31, figure 11.

5. Dongdianzi, Xuzhou, Jiangsu. Western Han (similar to figure 14n).⁸⁴
6. Shangwang, Linzi, Shandong. Early second century BCE (figure 14m).⁸⁵
7. Tomb of King Nanyue Wang, Guangzhou, Guangdong. End of second century (figure 14n).
8. Tomb of Princess Dou Wan, Mancheng, Hebei. End of second century BCE.⁸⁶

The list can be extended with finds of pegs, such as that in a Western Han tomb at Xi'an, Shaanxi,⁸⁷ but they have only recently begun to be identified.

Another aspect of pegs has an East-West aspect, albeit a less precise one. This concerns the very idea of peg-tuning which—curiously—arose nearly simultaneously at both ends of the Asian continent. The first Western pegs were found on an Anatolian lyre dated 400–200 BCE.⁸⁸ In the East, as we have seen, the first case is documented in 433 BCE.

3. Textual evidence for the northern affinity of the *qin*

The archaeological evidence gives large disparity between the numbers of *qin*-zithers (four) and *se*-zithers (about seventy) excavated in the southern state of Chu.⁸⁹ A similar preference for the *se* is shown in a southern text of the fourth and third centuries BCE, the *Chu Ci*.⁹⁰ It mentions zithers six times, and each time it is the *se*. On the other hand, northern texts give approximately equal weight to both *se* and *qin*. The *Shi Jing* mentions the *se* eleven times and the *qin* nine times, pairing the instruments eight times. Apparently, the *qin* flourished mainly in the north, while the *se* was appreciated both north and south. This evidence corroborates the information derived from the *qin*'s shape and tuning keys. All concur that the ancient *qin* derived from parts that had originated in the north and west.

During the Han dynasty the *se* and *qin* spread out across China. Sets of Han string anchors, typical of *se*-zithers,⁹¹ have been recovered from northern and southern sites alike, indicating that the instrument was widespread. Likewise, Han tuning keys have been recovered north and south. The dispersion of instruments and the breakup of their regional separation was likely a result of improved transportation facilities and strengthened central bureaucracy. The tendency fits the national agenda advanced by Emperor Wudi when he requested ministers to “unify the people and universalize the culture” in 128 BCE.

⁸⁴ Wenwu 1999.12, 4–18.

⁸⁵ Zibo shi bowuguan & Qi gucheng bowuguan, eds., *Linzi Shang Wang mudi* (Jinan: Qilu, 1997), 41 and figure 31: 2.

⁸⁶ Zhongguo shehui kexueyuan kaogu yanjiusuo, *Macheng Han mu fajue baogao* (Beijing: Wenwu), 1980, volume 1, 277; and volume 2, plate 90.

⁸⁷ Wenwu 2004.6, 9, figure 6: 9.

⁸⁸ At Canakkale (Lawergren, “To Tune a String,” 181).

⁸⁹ Lawergren, “Strings,” 67.

⁹⁰ *Jiu ge* [Nine Songs]: *Dong huang tai yi* [The Great Unity, God of the Eastern Sky], line 11, and *Dong jun* [The Lord of the East], line 11; *Yuan you* [Far-off Journey], line 145; *Zhao hun* [Summons of the Soul], lines 115 and 117; *Da zhao* [The Great Summons], line 48. Translations in David Hawkes, *The Songs of the South* (Harmondsworth: Penguin, 1985), 102, 113, 198, 228, and 235 respectively.

⁹¹ Lawergren, “Strings,” 69.

4. Additional similarities between qin-zithers and steppe harps

Several other properties of the ancient *qin* bring steppe harps to mind. A striking feature of traditional *qin*-music is the frequent use of *glissando*-playing. To produce it, a finger on the left hand presses down on the plucked string and quickly slides along it. This changes its length, and sounding pitch. This *glissando* is often accompanied by extraneous friction noises. But this sound could not have been produced on the earliest *qins*, such as Yi's. Its strings were suspended high above the fingerboard and would have broken if pressed all the way down.⁹² Yi's instrument could only have played open strings, and that—of course—was also the playing technique of steppe harps. Neither of these early instruments could have produced *glissandi*. But around 200 BCE the spacing between the strings and fingerboard was reduced to permit *glissando*-playing.⁹³

The number of strings on steppe harps is not completely known, but they seem to have been low, such as 3, 5, 5, and 15.⁹⁴ The earliest ancient *qin* had 10, but later ones stabilized at 7, a relatively low number when compared to the 25 strings found on the *se*. In this regard, the *qin* was closer to the steppe harp than to the *se* which was the dominant type of zither.

One can draw the same conclusion about sizes. Marquis Yi's *qin* was about 65 cm long,⁹⁵ but his twelve *se*-zithers were 167 cm.⁹⁶ Steppe harps were 70 ± 15 cm long,⁹⁷ close to the length of the former.

5. Conclusion

Ancient musical migrations transfer various amounts of features. At one extreme is the total importation of instruments and all their paraphernalia. It is exemplified by the extensive transfer of instruments, melodies, and societal function during the height of the Silk Road. Similar mechanisms brought mainland music to Buddhist Japan during the first millennium CE. Chinese emperors would send gifts to Japan where they would exert great influence. Many of the instruments stored in the Shôsôin Treasure House, Nara, provide most valuable examples. These show Chinese conditions during the seventh to eighth centuries CE.⁹⁸

But more often the migration is more restricted, and features may be modified in the process. An example is the spread of lyres from Greece into the Hellenistic world and the subsequent move into the Greco-Roman realm. In both phases the instruments were strongly modified, but retained the basic structure that classified them as lyres.

⁹² Lawergren, "The Metamorphosis of the *Qin*," 36.

⁹³ Lawergren, "The Metamorphosis of the *Qin*," 35–36.

⁹⁴ See note 60.

⁹⁵ Lawergren, "The Metamorphosis of the *Qin*," figure 7.

⁹⁶ Lawergren, "Strings," figure 3.6.1.

⁹⁷ Based on three published lengths of the two harps from Zaghunluq and the one from Yanghai (figure 11).

⁹⁸ E.g., Lawergren, "The Metamorphosis of the *Qin*," figure 2m.

In the case of the ancient *qin* the changes were complex. Only some features transferred from the steppe harps, others belonged to the local heritage of zithers. The shape of the neck-and-body was modified and combined with features characteristic of Eastern zithers—such as strings stretched above a nearly flat body and a player kneeling beside the instrument. Foreign traits mixed with indigenous ones. Another foreign concept appeared on tuning keys: their artistic repertoire is foreign—but the concept of tuning with a key was probably not. One can extend the same bimodal scheme to other parts, e.g., strings. Most likely the *qin* had (indigenous) silk strings. But the steppe harp from Pazyryk had sinew strings.

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Figure 1.
Instruments typical
of Shang ensem-
bles. The extant
ones (marked with
a star) date to the
Shang and the
representations
from Zhou and
Han.

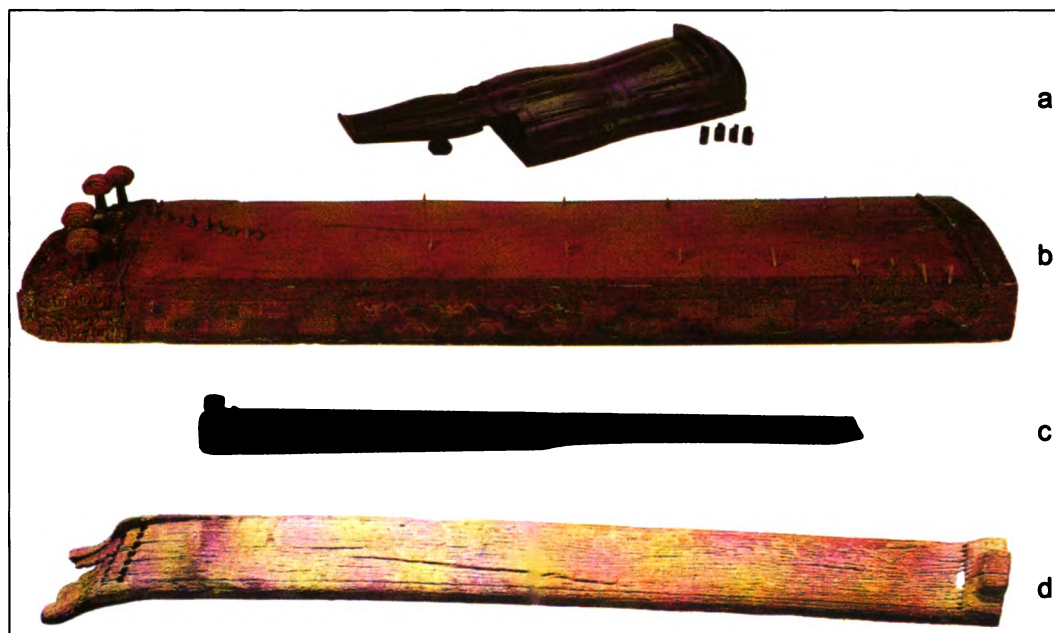
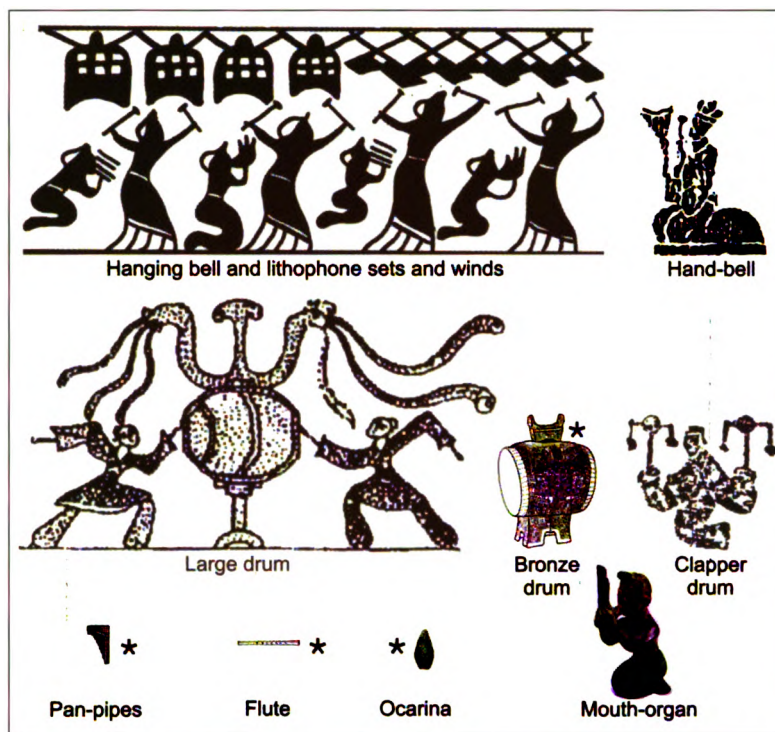


Figure 2

- a. The *qin* from the tomb of Marquis Yi of Zeng, 433 BCE. Lacquered wood. Ten strings. Length 67 cm. After Li Chunyi 1996, 449 and figure 266.
- b. A *se* from the tomb of Marquis Yi of Zeng, 433 BCE. Lacquered wood. Twenty-five strings. Length 167 cm. After Huang Xiangpeng 1996 (Hubei), 275.
- c. The *zhu* from the tomb of Marquis Yi of Zeng, 433 BCE (reconstruction). Lacquered wood. Five strings. Length 115 cm. After DeWoskin 1990, 33.
- d. The *zheng* from Changqiao, Wu Xian, Jiangsu. Fifth century BCE. Wood with traces of lacquer. Length 132.8 cm. Twelve strings. After Huang Xiangpeng 1996 (Jiangsu/Shanghai) 248–51.

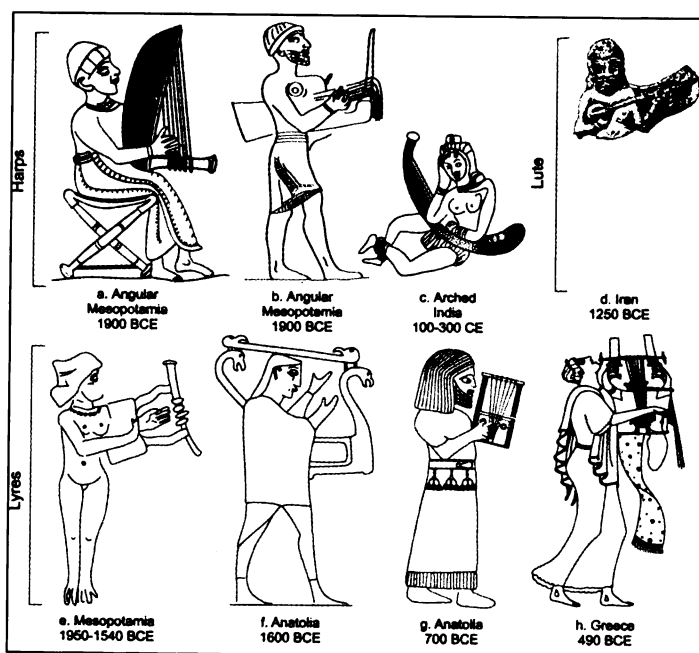


Figure 3.

Western chordophones.

- a: Vertical angular harp;
- b: Horizontal angular harp;
- c: Arched harp;
- d: Long-necked lute;
- e: Thin lyre;
- f: Thick lyre;
- g: Thin lyre;
- h: Greek lyre ("kithara").



Figure 4.

Buddhist ensemble from the tomb of prince Li Shou, 630 BCE, Sanyuan, Xian, Shaanxi. (After Fong 1987, figure 23).

- a: Vertical angular harp;
- b: and c: Lutes;
- d: Zheng-like zither;
- e: Mouth-organ;
- f: Side-blown flute;
- g: Pan-pipe;
- h: End-blown reed-pipe (or flute);
- i: Hand-held cymbals;
- j: Gong;
- k: Waisted drum;
- l: Ocarina or conch shell.

Figure 5.

Boya plays the *qin* among companions. Part of scenes on Han bronze mirror.

- a: Western Han, *circa* 200 BCE.
Freer Gallery of Art,
Washington (DC). F1935.13.
- b: Eastern Han, 25–220 CE.
Freer Gallery of Art, F1935.15.

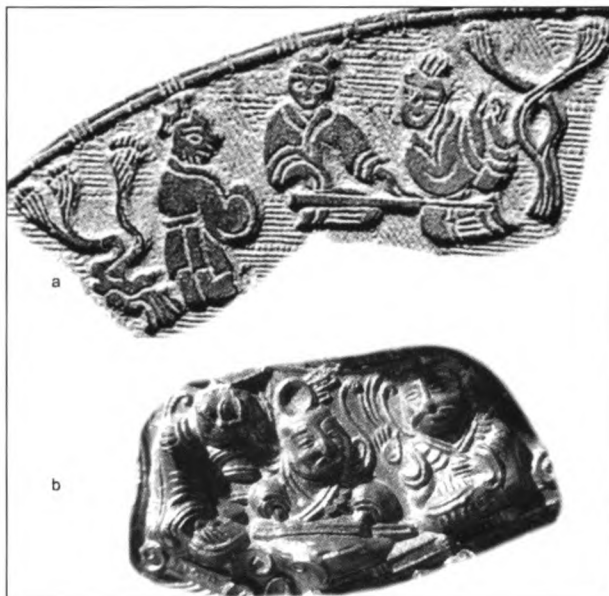
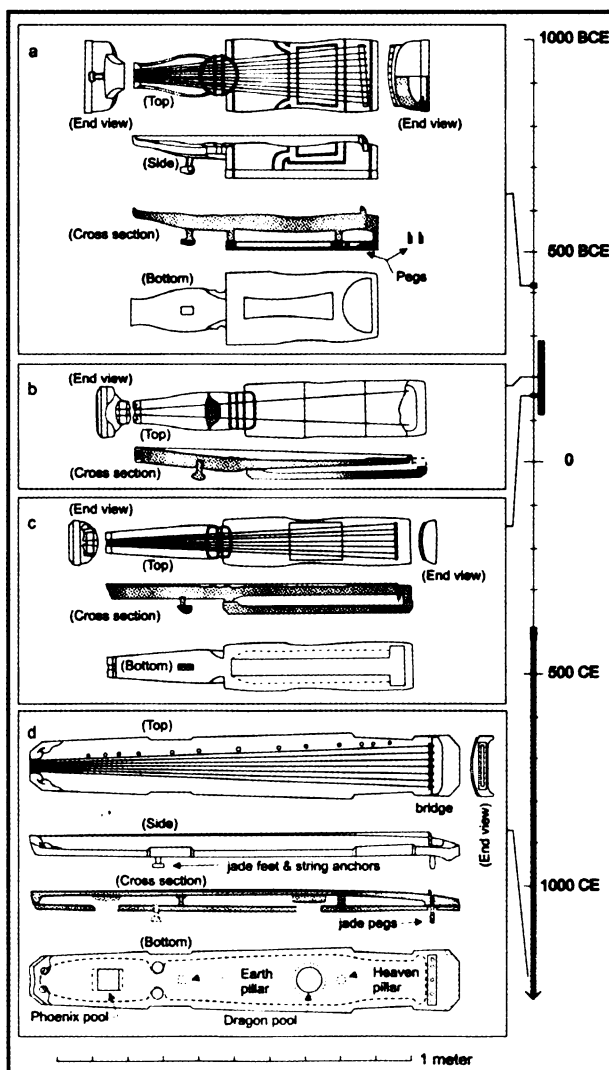


Figure 6

Qin-zithers, all drawn on the scale given at the bottom of the figure:

- a: Ancient model. Leigudun, Suizhou, Hubei (Zeng Hou Yi). 433 BCE. Length 67 cm. Ten strings. Lawergren 2000, 76.
- b: Ancient model. Wulipai Tomb 3, Changsha, Hunan. Third century BCE. Length 79.5 cm. Possibly nine strings. Lawergren 2000, 76.
- c: Ancient model. Mawangdui Tomb 3, Changsha, Hunan. Second century BCE. Length 82.4 cm. Seven strings. Lawergren 2000, 76.
- d: Classical model, made by Prince Lu in 1633 (or early 1634). Length 120 cm. Seven strings. Metropolitan Museum of Art, Department of Musical Instruments, 1999.93. Lawergren 2000, 76.



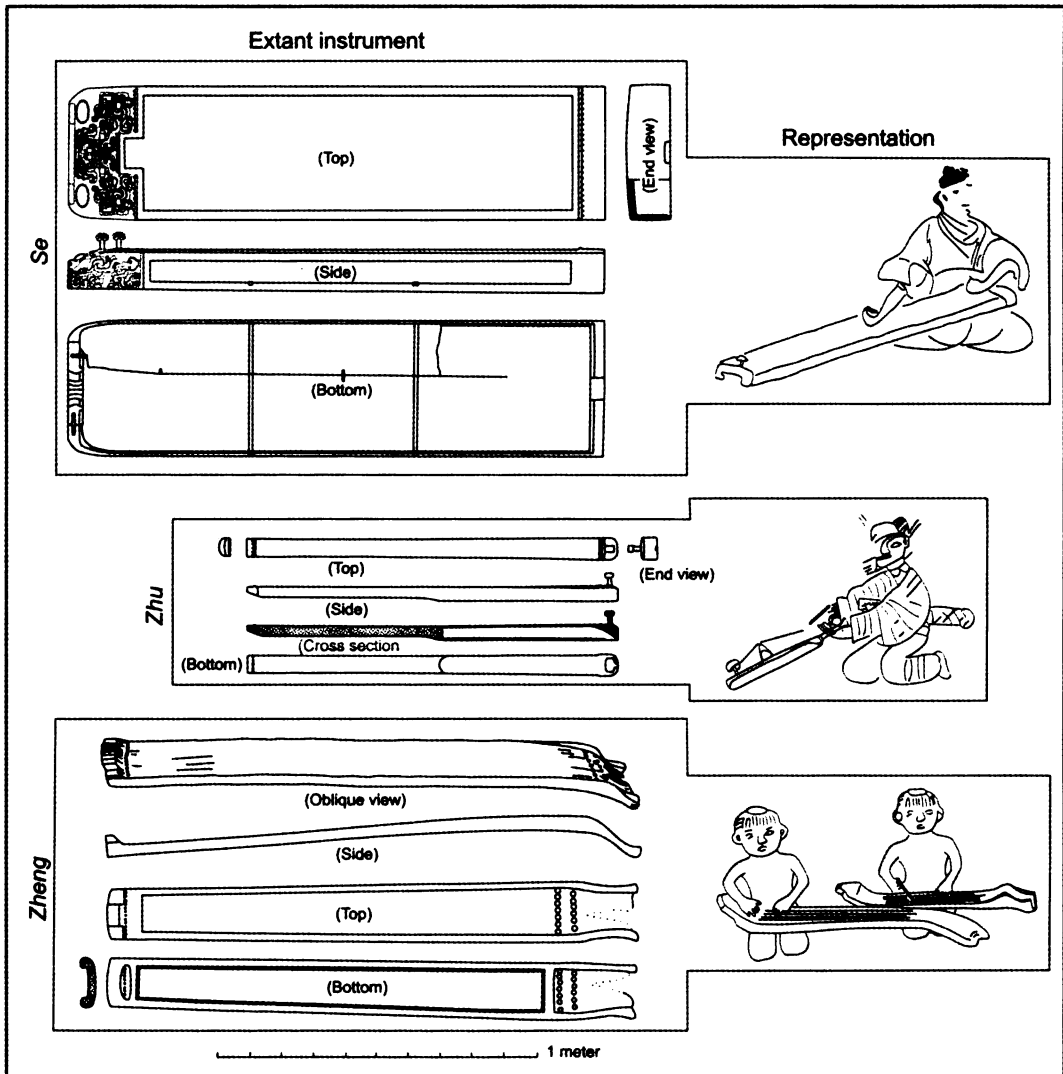


Figure 7.

Three other types of zither from the fifth century BCE, all drawn on the scale given at the bottom:

Se: Leigudun, Suizhou, Hubei (Zeng Hou Yi). 433 BCE. Length 167 cm. Twenty-five strings. Lawergren 2000, 72.

Zhu: Leigudun, Suizhou, Hubei (Zeng Hou Yi). 433 BCE. Length 115 cm. Five strings. Lawergren 2000, 80.

Zheng: Guixi Xian Tomb 2, Jiangxi. Length 166 cm. Thirteen strings. Lawergren 2000, 82.

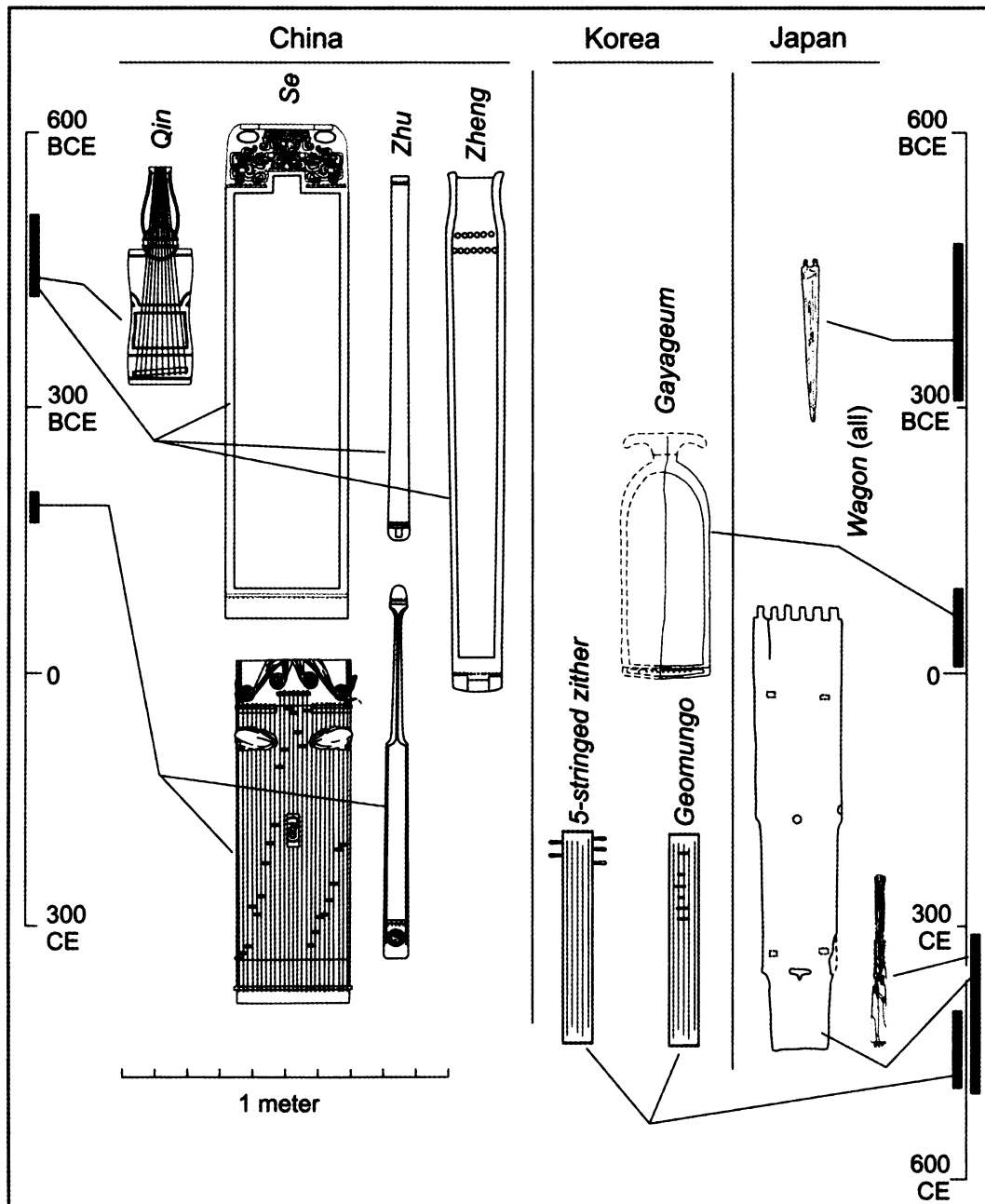


Figure 8.

Line drawings of Far Eastern zithers attested before 400 CE. All are drawn on the scale given at the bottom, and dated on the vertical axes on the left and right. The Chinese examples are taken from figures 6 and 7 or from Lawergren 2000, 72 and 80. Only the right half (solid line) of the Korean *Gayageum* was recovered, see Cho et al. 2002, 17. The other two Korean instruments were painted on the walls of Tomb no. 1, Changchuan, Qi'an, Jiling, Manchuria. The tomb is reconstructed in the Korean National Museum (also Song 2000, 142–145). For the Japanese instruments, see Hughes 1987, 64 and 82.



Figure 9.
Photographs of zithers
in figure 8. They are not
shown on the same scale.
The broken Japanese wagon
in the lower left corner
reveals the box-like struc-
ture.

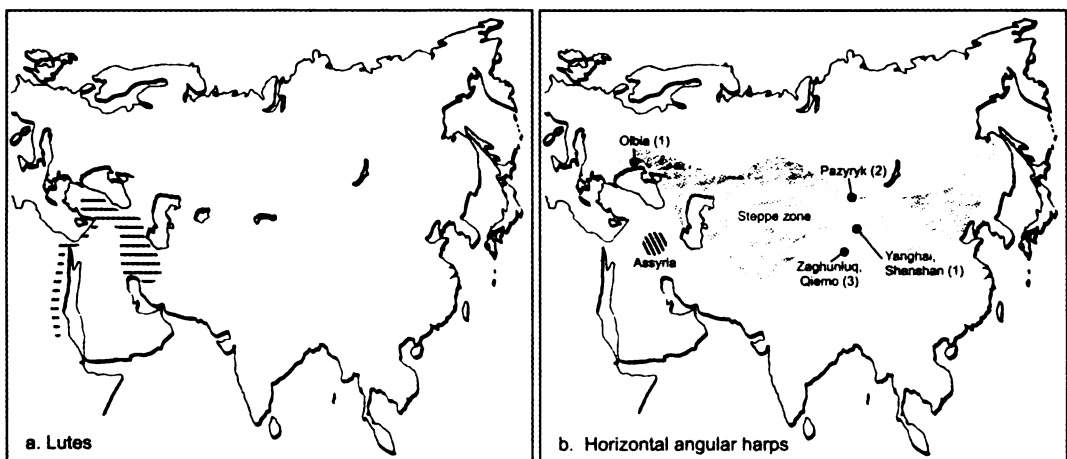


Figure 10.

The geographic spread of (a) lutes and (b) horizontal angular harps before the time of the Silk Road. Lutes occupy regions close to the Fertile Crescent, while harps are restricted to Assyria and areas near the edge of the Eurasian steppe.

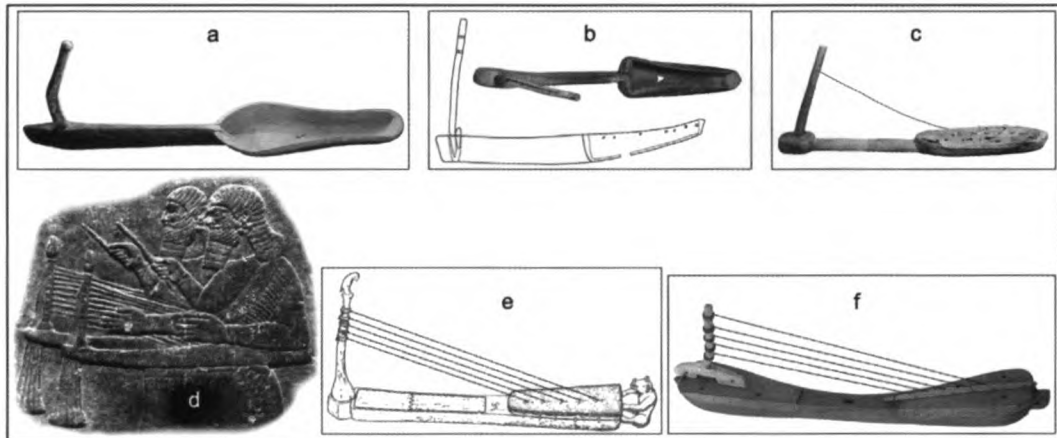


Figure 11.

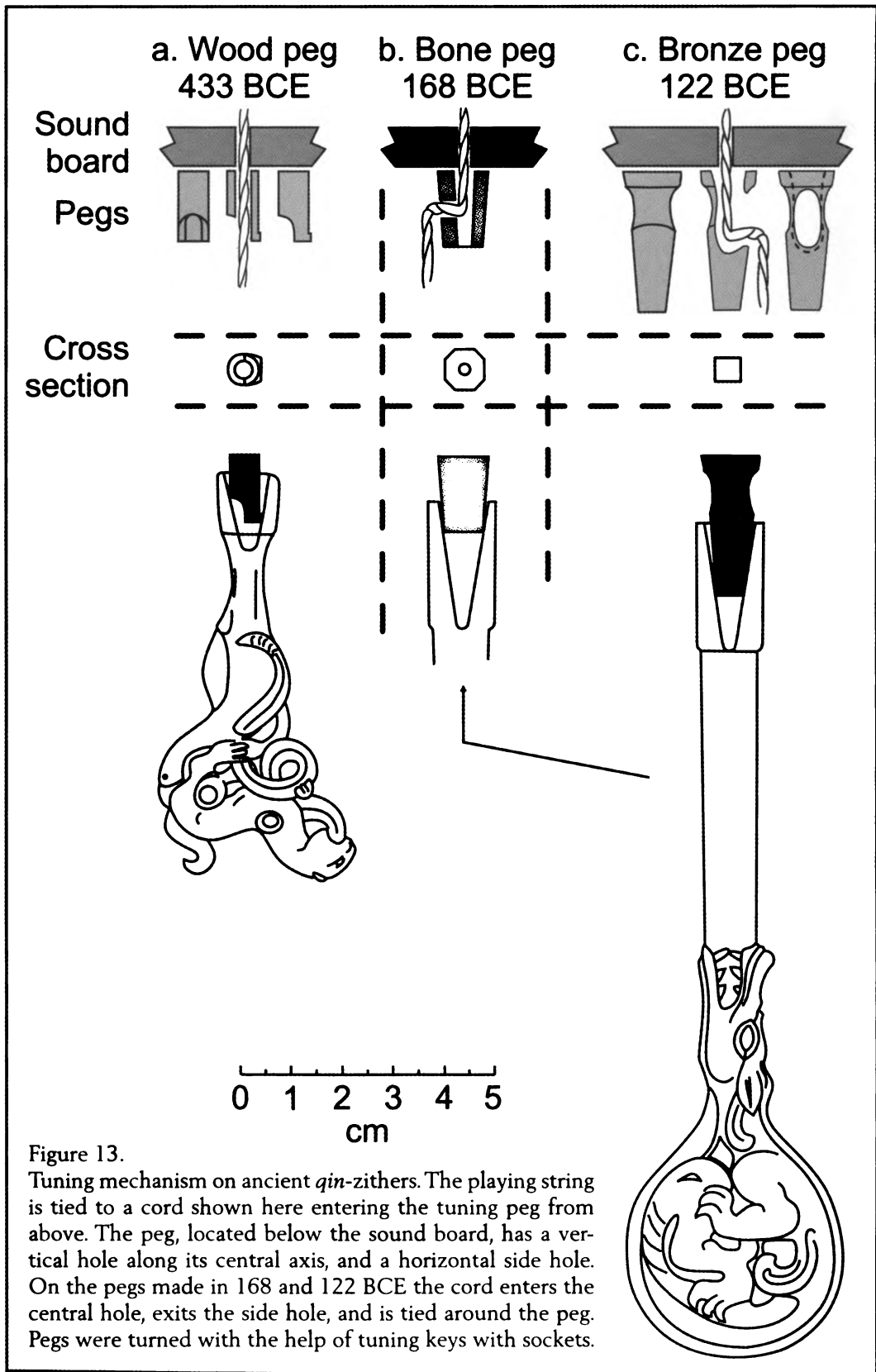
Horizontal angular harps.

- a: Extant Steppe harp at Zughunluq, Qiemo county, Xinjiang Autonomous Region (southern edge of the Tarim basin), item 20 in tomb M14, length = 87.6 cm, 400–200 BCE.
- b: Extant Steppe harp at Zughunluq, object 27 in tomb M14, length = 61.6 cm, 400–200 BCE.
- c: Extant Steppe harp at Yanghai, Shanshan county, Xinjiang (northern edge of the Tarim basin), first millennium BCE.
- d: Wall relief of an Assyrian harp at Nimrud, Iran, 860 BCE.
- e: Extant Steppe harp at Olbia, northern shore of the Black Sea, 400–200 BCE.
- f: Replica of an extant Steppe harp at Pazyryk, Altai Mountain, 350 BCE.



Figure 12.

Part of a decorative plaque attached to the side of a 140 cm high wooden Mesopotamian lyre. 2450 BCE. University of Pennsylvania Museum of Archaeology and Anthropology, Philadelphia, B17694. Shell and bitumen. Height 7.5 cm. Rashid 1984, 41. The scene shows a donkey playing a lyre. Its resonance box is shaped like a cow lying on folded legs. A standing bear supports the instrument, and a small fox sits on the bear's right foot playing a sistrum. The eight strings terminate in plaited collars wound around the horizontal yoke.



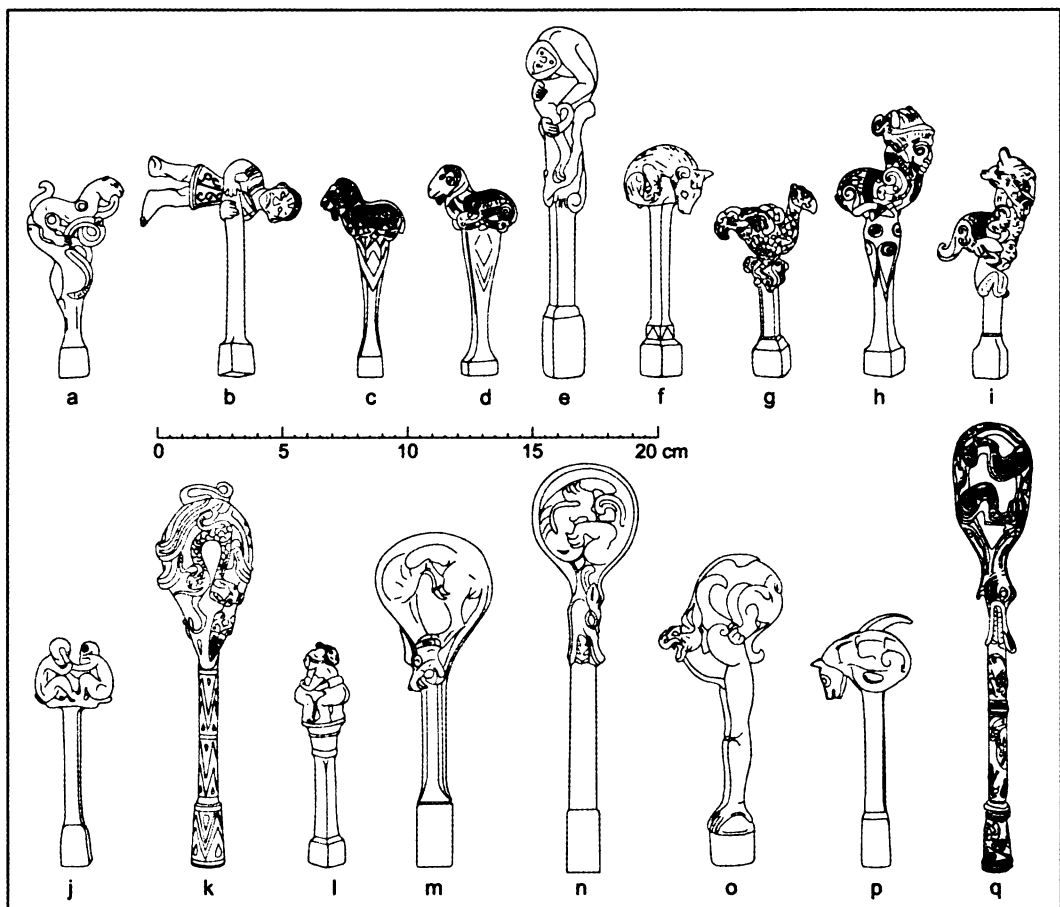


Figure 14

- a. Bird attacking feline that bites coiled snake. Sixth century BCE. Freer Gallery of Art, Washington, F1916.454. Lawergren 2000, figure 3.9.3a.
- b. Acrobat. Fifth century BCE. Formerly J. J. Lally & Co, New York (1994).
- c. Goats. Fifth to fourth century BCE. Formerly E. & J. Frankel Gallery, New York (1985). Lawergren 1997, figure 1C.
- d. Goats. Fifth to fourth century BCE. Lawergren 2000, figure 3.9.3b.
- e. Seated monkey turning his head and holding his raised left leg. Fourth century BCE (?). Collection of Ariadne Galleries, New York.
- f. Bear. Fourth century BCE. Lawergren 2000, figure 3.9.3c.
- g. Raptor holding bear cub. Fourth century BCE. Lawergren 2000, figure 3.9.3d.
- h. Goat-men. Third century BCE. Fantastic composite beast with human head. Lawergren 2000, figure 3.9.3e.
- i. Goat-men. Third century BCE. Fantastic composite beast with human head held aloft by a small crouching humanoid figure. Kasmin Ltd., London.
- j. Erotic monkeys. Third century BCE. Formerly Christie's, New York (2001).
- k. Large bird and feline. Third to second century BCE. Lawergren 2000, figure 3.9.3f.
- l. Two plump men wrestling. Circa 200 BCE. Formerly J. J. Lally & Co, New York (1992).
- m. Quadruped. Second century BCE. Lawergren 2000, figure 3.9.3h.
- n. Coiled wolflike animal. Second century BCE. Lawergren 2000, 122 BCE.
- o. Fantastic beast with massive human arms gripping the base. His clawed hind legs stand on the shoulders. Second to first century BCE. Formerly J.J. Lally & Co, New York (1992).
- p. Crouching bear. On the top of the animal is a flick-knife probably used when mending silk strings. Second to first century BCE. Formerly J. J. Lally & Co, New York (2001).
- q. Wolf-like animal with gemstone inlay. Solid silver with inlay of carnelian, agate [white & clear], and turquoise. Second to first century BCE. Lawergren 2003a, figure 5i.

Two Issues Concerning Ancient Domesticated Horses in China

by

Yuan Jing and Rowan Flad¹

Studies specifically focused on early domestic horses in China, by both Chinese and foreign scholars, have tended to emphasize questions of origins. Stanley J. Olsen, for example, has proposed that domesticated horses first appeared in China in the middle period of the Chinese Neolithic (ca. 6000–4800 ybp [Years Before Present]).² Others, such as Zhou Benxiong, Xie Chengxia, Wang Yitao, and Suezaki Masumi all argue that domesticated horses originated in China during the Late Neolithic Longshan Culture period (ca. 4800–4000 ybp).³ A terminal Xia or Shang period origin is suggested by Wang Zhijun (ca. 4000–3050 ybp),⁴ and Hayashi Minao proposes the latest date of horse domestication – between the Shang and the Warring States periods (ca. 3370–2475 ybp).⁵ It seems more likely, however, that in the middle and lower reaches of the Yellow River at least, the origin of domesticated horses in China dates to the late Shang period (ca. 3370–3050⁶ ybp).⁷

¹ Yuan Jing, Institute of Archaeology, Chinese Academy of Social Sciences; Rowan Flad, Harvard University.

² Stanley J. Olsen, “Zhongguo beifang de zaoqi xunyang ma (Early domesticated horses in northern China).” *Kaogu yu wenwu* 1986.1, 89–91.

³ Zhou Benxiong “Zhongguo xinshiqi shidai de jiachu (Domesticates of the Chinese Neolithic),” in *Zhongguo shehui kexueyuan kaogu yanjiusuo*, ed., *Xin Zhongguo de kaogu faxian yu yanjiu* (New discoveries and research in Chinese archaeology) (Beijing: Wenwu, 1984); Xie Chengxia, “Gudai Zhongguo ma pi liyong de lishi (History of the ancient Chinese use of horses).” In Zhang et al., eds., *Zhongguo xumu ciliao ji* (Compilation of data concerning Chinese husbandry) (Beijing: Kexue, 1986), 103–22; Wang Yitao, “Ye tan Zhongguo malei dongwu lishi ji xiangguan wenti (Discussing the history of equids and related questions).” *Zhongguo wenwu bao*, August 12, 1998; Suezaki, Masumi, *Uma to ningen no rekishi: koko bijutsu ni miru* (The History of Horses and People: As Seen In Ancient Art) (Yokohama: Baji bunka zaidan), 1996.

⁴ Wang Zhijun et al., “Zhongguo beifang jia ma qiyuan wenti de tantao (A discussion of the problem of the origin of the domestic horse in North China),” *Kaogu yu wenwu* 2001.2, 26–30.

⁵ Hayashi Minao, “Chugoku senshin jidai no uma (Horses in pre-Qin China),” *Minzokugaku kenkyu* (Ethnology Research) 23.4 (1959), 39–50; “Chugoku senshin jidai no uma (Horses in pre-Qin China),” *Minzokugaku kenkyu* 24.1–2 (1960), 33–57.

⁶ The dates provided are estimates of the extent of the various eras that are discussed. The terminal year of the Shang Dynasty is now generally accepted to have been 1046 BC based on the publications of the recent Three Dynasties Chronology project (Xia, Shang, Zhou Duandai Gongcheng Zhuanjiazhu, *Xia, Shang, Zhou duandai gongcheng 1996–2000 nian jieduan chengguo baogao* (Report on the results of the 1996–2000 work of the Xia, Shang, Zhou periodization project). Beijing: Shijie tushu, 2000.), although there is still some debate about this issue. (See for example David S. Nivison, “The Xia–Shang–Zhou Chronology Project: Two Approaches to Dating,” *Journal of East Asian Archaeology* 4.1–4 (2002), 359–66). When referring to general periods in this article we prefer to use rounded dates before present (AD 2004).

This essay supports this position on the origins of domesticated horses in the middle and lower reaches of the Yellow River valley and also introduces some preliminary hypotheses concerning the practice of horse castration in early China.

I. The Origin of Domesticated Horses in China

Pleistocene horse fossils have so far been found in 32 locations in China (see Figure 1). Most of these sites are concentrated in northern China. Some locations have large numbers of horses while others have few. For example, based on the total number of third molars found at the site of Shiyu in Shanxi, the remains at that site represent at least 120 horses.⁸ The late Pleistocene horse fossils in this area seem to all represent generalized wild horses (*Equus przewalskyi* Poliakof).⁹

Only seven Neolithic era (ca. 10,000–4,000 ybp) sites with horse bones have been identified. These are all concentrated in the north (Figure 1) and none provide unequivocal evidence of domesticated horses. In some cases the numbers of horse bones are extremely small and provide little information that can be the basis of further research or that can be used to determine whether they represent domesticates. In other cases the bones are more numerous, but frequently they were not very thoroughly examined at the time of excavation, and the specimens have not been preserved for further study. These conditions make it very difficult for us to advance our understanding of the role of horses during this era. We must still depend on future discoveries if we are to comprehensively assess the possibility that domesticated horses existed in China during the Neolithic.¹⁰

No horse remains have been found at sites dated to the so-called “Xia” period of Chinese archaeology (ca. 4,000–3600 ybp), named for the first of the three legendary dynasties mentioned in ancient texts, and likewise, the subsequent early Shang era (ca. 3600–3300 ybp) has yielded no horse remains from sites dating to earlier than or equal to the Huanbei site in Anyang, Henan Province.¹¹ Yet in the same region (see Figure 1), the remains from the post-Huanbei Yinxu (Yin or Shang Ruins) site at Anyang (ca. 3370–3050 ybp) do include large numbers of chariots, most of which were buried in separate pits together with two horses (Figure 2). In addition, numerous horse-pits have been found at the site with between one and 37

⁷ An and Yuan 1998. This position is also supported by recent papers on horse domestication in China published after the initial submission of this article. See Kathryn Linduff, “A Walk on the Wild Side: Late Shang Appropriation of Horses in China,” in Marsha Levine et al., eds., *Prehistoric Steppe Adaptation and the Horse*. Oxford: Oxbow Books, 2003, 139–62; Victor H. Mair, “The Horse in Late Prehistoric China: Wrestling Culture and Control from the ‘Barbarians,’” in Marsha Levine et al., eds., *Prehistoric Steppe Adaptation and the Horse*. Oxford: Oxbow Books, 2003, 163–88.

⁸ Jia Lanpo et al., “Shanxi Shiyu jiu shiqi shidai yizhi fajue baogao (Excavation report from the Paleolithic site of Shiyu in Shanxi),” *Kaogu xuebao* 1972.1, 39–58.

⁹ Qi Guoqin, “Zhongguo beifang di si ji buludongwuqun jianlun yuanshi renlei de shenghuo huanjing (The fourth concurrent discussion of the mammalian fauna and the living environment of early humans in northern China),” in Wu Rukang et al., eds., *Zhongguo yuangu renlei* (China’s early hominids). Beijing: Kexue, 1991, 277–337.

¹⁰ An Jiayuan and Yuan Jing, “Xinjiang Hejing Xian Chawuhu gougou yi, san hao mudi dongwu guge yanjiu baogao (Report on the research on animal remains from the number 1 and 3 cemeteries at Chawuhu gougou in Hejing, Xinjiang),” *Kaogu* 1998.7, 63–68.

¹¹ Yuan Jing and Tang Jigen, “Huanbei Huayuanzhuang chutu dongwu guge yanjiu baogao (The report of the analysis of the animal bones excavated at Huayuanzhuang, Huanbei),” *Kaogu* 2000.11, 75–81.

horses. Most of these pits contain two horses per pit (Figure 3). In three such pits, the two horses were found together with a single human sacrificial victim (Figure 4). We can be certain, based on these remains, that the middle Yellow River valley was the home of domesticated horses at least as early as 3370 ybp.¹²

It seems as if domesticated horses were not present in the Central Plains until the late Shang period. At that point the role of horses in society was quite special, and their use was limited to the upper aristocrats and royalty. These upper ranks of society used horses for charioteering and sacrifice and also employed horses as elite burial goods. There is no evidence that horses were eaten or used as draft animals by the Shang. This relates to the reasons why we have not discovered horse remains in the deposits at the Shang site of Huanbei. The Shang treated horses very differently than chickens, dogs, pigs, cattle, and sheep. Oracle bone inscriptions discovered at Yinxu mention the sacrificial use of chickens, dogs, pigs, cattle, and sheep and, in fact, the remains of such sacrifices have been discovered at the site. But bones of all these animals have also been found in cultural deposits and in refuse pits. By all appearances, these latter remains were the remnants of Shang consumption practices, not sacrifices. Horse bones are apparently never found in such contexts¹³ and so it seems that whereas most domesticates were used by the Shang in both subsistence and sacrificial activities, horses were exclusively disposed of through sacrifice or in mortuary contexts.

Research on ancient inscriptions gives us another line of evidence that we can use to examine the role of horses for the Shang. While some oracle bones record the inscription "The king fed horses in the stables" (Figure 5),¹⁴ no such inscriptions describing the king feeding cattle, sheep, dogs, chickens, or pigs have ever been identified. This oracle bone inscription concerning the king feeding horses highlights the importance of horses to the Shang. The king probably did not personally raise horses, but the phrase "the king fed horses in the stables" most likely refers to the symbolic role that the king played in horse rearing. It is, however, just this sort of symbolic participation by the king in raising the horses that demonstrates their significance.

At present, scholars have not yet been able to conduct measurements of horse bones post-dating 3000 ybp due to the constraints placed upon us by archaeological remains.¹⁵ Since the horse bones from late Shang contexts (ca. 3370–3050 ybp) have not yet been available for measurement and likewise, no DNA tests have been

¹² Yuan and Flad, "Research on Early Horse Domestication in China," in Marjan Mashkour, ed., *Equids in Time and Space* (Oxford: Oxbow, 2005, forthcoming).

¹³ This pattern is pointed out by Shi Zhangru in "Henan Anyang Xiaotun cun Yin mu zhong de dongwu guhai" (Animal bone remains in the Yin tombs of Xiaotun, Anyang, Henan), *Guoli Taiwan daxue Wenshizhe xuebao* (Bulletin of the College of Arts, National Taiwan University) 5 (1953), 1–14; and again by Magnus Fiskesjö in his extensive treatment of Shang sacrifice and hunting ("Rising from Blood-Stained Fields: Royal Hunting and State Formation in Shang China," *Bulletin of the Museum of Far Eastern Antiquities* 73 (2001), 63, note 47).

¹⁴ Zhongguo Shehui Kexueyuan Lishi Yanjiusuo (CASS, Institute of History), ed. *Jiaguwen heji* (Compilation of oracle bone inscriptions) (Beijing: Zhonghua, 1981), Vol. 9, page 3603, No. 29415.

¹⁵ An Jiayuan and Yuan Jing, "Xinjiang Hejing Xian Chawuhu," Yuan Jing and An Jiayuan, "Ningxia Guyuan Shidaoluo mu chutu dongwu guge yanjiu baogao (Report on the research on faunal remains excavated from the tomb at Shidaoluo in Guyuan, Ningxia)," in Zhong Ri lianhe kaogudui, ed., *Ningxia Guyuan Shidaoluo mu* (The tomb at Shidaoluo in Guyuan, Ningxia) (Japan: Doumeisha, 1999), 78–96; Yuan Jing and Tang Jigen, "Huanbei Huayuanzhuang."

conducted on these remains, it is not yet possible for us to identify the origin of the late Shang domestic horses with any scientific precision. Based on the scanty archaeological evidence that is available, however, we can propose that the domestic horses found in late Shang contexts came into the middle and lower Yellow River drainage by way of diffusion from other areas.¹⁶ The source for domesticated horses is almost certainly the Central Asian steppe, to the North and West of the modern borders of China.

Much research on the *origins* of domesticated horses has focused on the Central Asian region.¹⁷ Many of these studies have emphasized the importance of the site of Dereivka in the Ukraine as the location of the earliest evidence for domesticated horses¹⁸ while others have focused on Botai.¹⁹ Although there is still some dispute over whether these remains represent fully domesticated horse populations,²⁰ intensive exploitation of horses across the steppe began at least as early as 5700–5150 ybp, well before the Shang horse remains at Anyang.

Horses remained a vital part of the Central Asian economy and powerful parts of the various ideological systems of the steppe for many millennia after their initial domestication.²¹

The transfer of domesticated horses from the Central Asian steppes to the Central Plains of China seems to have occurred quite rapidly, and most likely involved the adoption not only of the animal itself, but also of a suite of related techniques for effective rearing. We know that the Shang aristocracy had some interactions with northern peoples based on the styles of artifacts that have been discovered in Shang burials.²² This interaction clearly started well before the late Shang,²³ but present evidence suggests that horse rearing was adopted only in the Late Shang. What practices comprised the horse-rearing behaviors adopted by the Shang? Archaeological evidence related to this question is scarce in Shang contexts,

¹⁶ Hayashi, "Chugoku senshi jidai no uma," 1959, 1960.

¹⁷ David W. Anthony, "The 'Kurgan Culture,' Indo-European Origins, and the Domestication of the Horse: A Reconsideration," *Current Anthropology* 27.4 (1986), 291–313; "Horse, wagon and chariot: Indo-European languages and archaeology," *Antiquity* 69.264 (1995), 554–65; V. I. Bibikova, "A study of the earliest domestic horses of Eastern Europe, parts 1 and 2," reprinted in D.Y. Telehin, ed., *Dereivka: A Settlement and Cemetery of Copper Age Horse Keepers on the Middle Dnieper* (Oxford: British Archaeological Reports, BAR International Series, 1986), 135–62; Bökönyi Sándor, "The earliest waves of domestic horses in East Europe," *Journal of Indo-European Studies* 6 (1978), 17–73; Brown and Anthony, "Bit wear, horseback riding, and the Botai site in Kazakhstan," *Journal of Archaeological Science* 25 (1998): 331–47; C. Grigson, "The earliest domestic horses in the Levant? New finds from the fourth millennium of the Negev," *Journal of Archaeological Science* 20 (1993): 645–55; Marsha A. Levine, "Dereivka and the problem of horse domestication," *Antiquity* 64 (1990), 727–40; "Domestication of the horse," in Brian M. Fagan et al., eds., *The Oxford Companion to Archaeology* (Oxford: Oxbow, 1996), 315–17; "Botai and the origins of horse domestication," *Journal of Anthropological Archaeology* 18 (1999), 29–78; Dmitriy Yakolevich Telehin, ed., *Dereivka: A Settlement and Cemetery of Copper Age Horse Keepers on the Middle Dnieper* (Oxford: British Archaeological Reports, BAR International Series, 1986).

¹⁸ Bibikova, "A study of the earliest domestic horses of Eastern Europe."

¹⁹ Levine, "Botai and the origins of horse domestication."

²⁰ See Levine, "Botai and the origins of horse domestication."

²¹ For a detailed consideration of Iron Age horsemen of this region, see S. I. Rudenko, *Frozen Tombs of Siberia: The Pazyryk Burial of Iron Age Horsemen*. [Translated with preface by M. W. Thompson]. (Berkeley: University of California Press, 1970).

²² Lin Yün, "A Reexamination of the Relationship between Bronzes of the Shang Culture and of the Northern Zone," In K. C. Chang, ed., *Studies of Shang Archaeology* (New Haven: Yale University Press, 1986), 237–74.

²³ Louisa G. Fitzgerald-Huber, "Qijia and Erlitou: The Question of Contacts with Distant Cultures," *Early China* 20 (1995), 17–68.

but later evidence suggests that one important element was selective castration of horses used for certain activities. Paleographic evidence may suggest that this practice began as early as the initial Shang-era-adoption of domesticated horses.

II. Horse Castration

At present, the only firm attestation we have to the early practice of animal castration is, in fact, horse castration, but this evidence dates to 210 BC²⁴, during the much later Qin Dynasty. After the death of the first emperor of the Qin Dynasty, Qinshihuang, he was buried in the First Emperor's Mausoleum in the present day county of Lintong in Shaanxi Province. Archaeologists have found a group of large pits associated with the mausoleum about 1.5 km to the east of the tomb itself. Among these, pit number 1 contains battle chariots and infantry lined up in battle formations. Pit 2 contains a mixture of battle chariots, cavalry and infantry, also in organized units. In pit 3 the warriors are dressed as to appear like guards. The three pits include a total of at least 130 wooden battle chariots and 600 terracotta horses, 500 of which were found together with chariots and 116 of which were the horses used by cavalry. Altogether, over 7000 terracotta warrior figures were discovered in the pits.²⁵ Additionally, archaeologists also discovered a burial furniture pit with two horse and chariot models, each elaborately executed completely in bronze and each involving four horses.²⁶

All of the horses in pit number 1 pulled chariots: each chariot was pulled by four horses. The models show that chariot-pulling horses were castrated. In both of the images in figure number 6.1 you can clearly see that the penis is present but the testicles are not.²⁷ In pit number 2 both chariot pulling horses and cavalry horses are present. All of the cavalry horses have saddles and are therefore called "pommel horses."²⁸ The chariot-pulling horses were the same as those found in pit number one and the same as the bronze horses mentioned above: all of these only had penises and were without testicles (figure 6.2). The pommel horses were of two varieties, one type was castrated like the chariot horses (figure 7.1) and the other type, as seen in figure 7.2, had both penis and testicles.

Based on this analysis we see that the terracotta and bronze horses placed in these pits in Lintong cannot be separated into two types simply based on the presence or absence of testicles. One type of horse was clearly the castrated male horses that were replicated in pit number 1, in the bronze chariot pulling horses, in the terracotta horses in pit 2 that pulled the battle chariots, and also in some of the

²⁴ BC is used here because the precise calendar year is known for the year of the death of the first emperor of the Qin Dynasty (221–207 BC).

²⁵ Shaanxi Shihuangling Qin Yongkeng Kaogu Fajuedui (Archaeological Excavation Team for the Qin Tomb Figure Pits at the First Emperor's Mausoleum, Shaanxi), et al., eds. *Qinshihuangling bingmayong* (The soldier and horse burial-figures at the mausoleum of the first emperor of Qin) (Beijing: Wenwu, 1983), 1.

²⁶ Qinshihuang Bingmayong Bowuguan, et al., (Museum of Terracotta Soldiers at the Mausoleum of the First Emperor), et al., eds. *Qinshihuang ling tong chema fajue baogao* (Excavation report on the bronze chariot and horses from the Mausoleum of the First Emperor of Qin) (Beijing: Wenwu, 1998), 182–88.

²⁷ Shaanxi Sheng Kaogu Yanjiusuo (Shaanxi Provincial Institute of Archaeology), et al., eds. *Qinshihuangling bingmayongkeng yi hao keng fajue baogao* (Excavation report of pit number 1 of the soldier and horse burial-figure pits at the mausoleum of the first emperor of Qin) (Beijing: Wenwu, 1988), 187, 191.

pommel horses that were found in pit 2. It is clear that all of the horses that pulled chariots in that era were castrated horses, but pommel horses came in two varieties, those that were castrated and those that were not. Most likely these differences were related to the desire to control the temperament of the chariot pulling horses and the greater degree of variability that could be tolerated in horses that were to be ridden into battle. Nevertheless, at this point we have no way of explaining exactly why this difference existed, but it is clearly valuable information for understanding the techniques of horse rearing used at that time and the prevalent system of horse use.

Some paleographic evidence tentatively suggests that castration practices predate the Qin period quite considerably. Oracle bones dating to between ca 3370 and 3050 ybp contain references to castration of other animal types. One example of this is the two variations on the character for pig: one with a graph connected to the body of the pig and one with the graph disconnected from the body (Figure 8.1 and 2). According to the research of Wen Yiduo, the variation with the connected graph refers to a male pig or boar while the example with the disconnected graph refers to castrated pigs.²⁹ Other oracle bone inscriptions include horse glyphs with an extra symbol added to the body of the horse (figure 8.3). According to Wang Yuxin's textual analysis, this line or strip is a convention to stand for the removal of the horse's testicles.³⁰

Was horse castration part of the horse rearing borrowed by the Shang from those who previously had domesticated horses? The evidence is too scanty to say for sure. It is possible, however, that the practice was part of a received horse rearing tradition. Some well-preserved tombs at the site of the Pazyryk burials in Siberia may even show evidence of having been castrated.³¹ These burials date to the first millennium BC, and if castrated horses have been clearly identified at the site, horse castration can be said to have been part of the Central Asian tradition at least by that point. In any case, earlier evidence is still lacking. Age profile analyses of the horse remains from second millennium BC Central Asian and Shang contexts might shed further light on this issue and should be undertaken in the future.

²⁸ Yuan Zhongyi, "Qinshihuangling dongce di er, san hao tongkeng junzhen neirong shitan (Preliminary discussion of the significance of the arrangement of soldiers in figurine pits number 1 and 3 to the east of the mausoleum of the first emperor of Qin)," in Yuan Zhongyi et al., eds., *Qin tong yanjiu wenji* (Corpus of research on Qin tomb figures) (Xi'an: Shaanxi renmin meishu, 1990), 217–30.

²⁹ Wen Yiduo, "Shi tun (Explaining pig)." *Kaoguxueshe she kan* (Publication of the Archaeology Society) 1937 (6): 188–94.

³⁰ Wang Yuxin, "Shangdai de ma he yang ma ye (Shang horses and the industry of horse breeding), *Zhongguo shi yanjiu* (Chinese Historical Research) 1980.1, 99–108.

³¹ The existence of these remains was recalled by David Anthony in a conversation in 2004, but they are not reported in Sergei Ivanovich Rudenko, 1970, *Frozen Tombs of Siberia: The Pazyryk Burial of Iron Age Horsemen* [Translated with preface by M. W. Thompson], (Berkeley: University of California Press, 1970).

Conclusion

Wild horses clearly existed in China during the Paleolithic era and were hunted by contemporaneous humans. By the Neolithic in China, however, there was little or no contact between humans and horses. Suddenly, in the Late Shang period, large numbers of domesticated horses appeared in the middle lower Yellow River valley – possibly due to diffusion from the north or west. The adoption of domesticated horses involved not only the use of the animals, but also must have included the acceptance of new animal rearing techniques. Systematic castration may have been among these techniques. According to present archaeological evidence, beginning at least as early as the Qin era, the Chinese had mastered the techniques of horse castration. This procedure may have its beginnings in China as early as the Shang era.

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TWO ISSUES CONCERNING ANCIENT DOMESTICATED HORSES IN CHINA

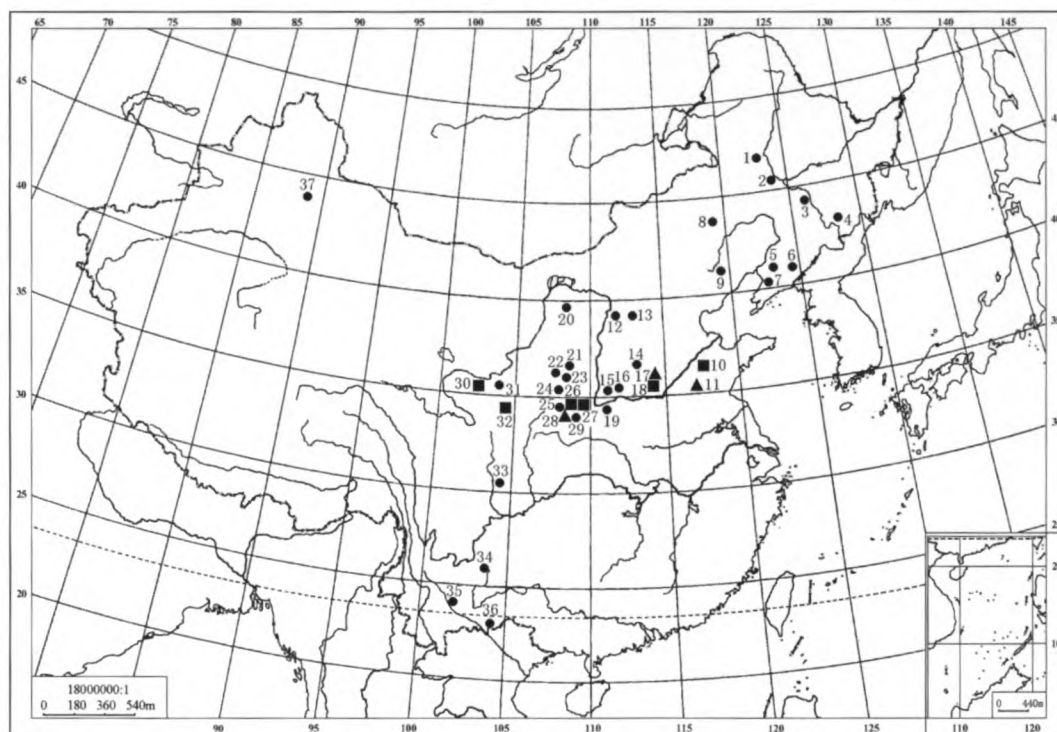


Figure 1 Distribution of Archaeological Sites with Horse Bones in China

• Paleolithic Sites ■ Neolithic Sites ▲ Sites of Shang

- 1 Angangxi 2 Qingshantou 3 Daqiaotun 4 Shimenshan 5 Sandaogang 6 Gezidong
 7 Xiaogushan 8 Wuerji 9 Benxi 10 Chengziya 11 Qianzhangda 12 Shiyu
 13 Wutaishan 14 Dangcheng 15 Dingcun, Xigou 16 Xujiayao 17 Yinxu 18 Baiying
 19 Checun 20 Salawusu 21 Rouyuan 22 Liujiacha 23 Zhaojiazhuang, Longgugou
 24 Yaotougou, Yaergou / Jiangjiawan, Sigoukou / Niujiaogou, Hezhigou 25 Dabeigou
 26 Banpo 27 Nanshacun 28 Laoniupo 29 Laochihe 30 Dahezhuang, Qinweijia
 31 Shangkushui 32 Fujiamen 33 Liyuqiao 34 Wangjiayuanzi 35 Laolongdong
 36 Xichou 37 Cangfanggou

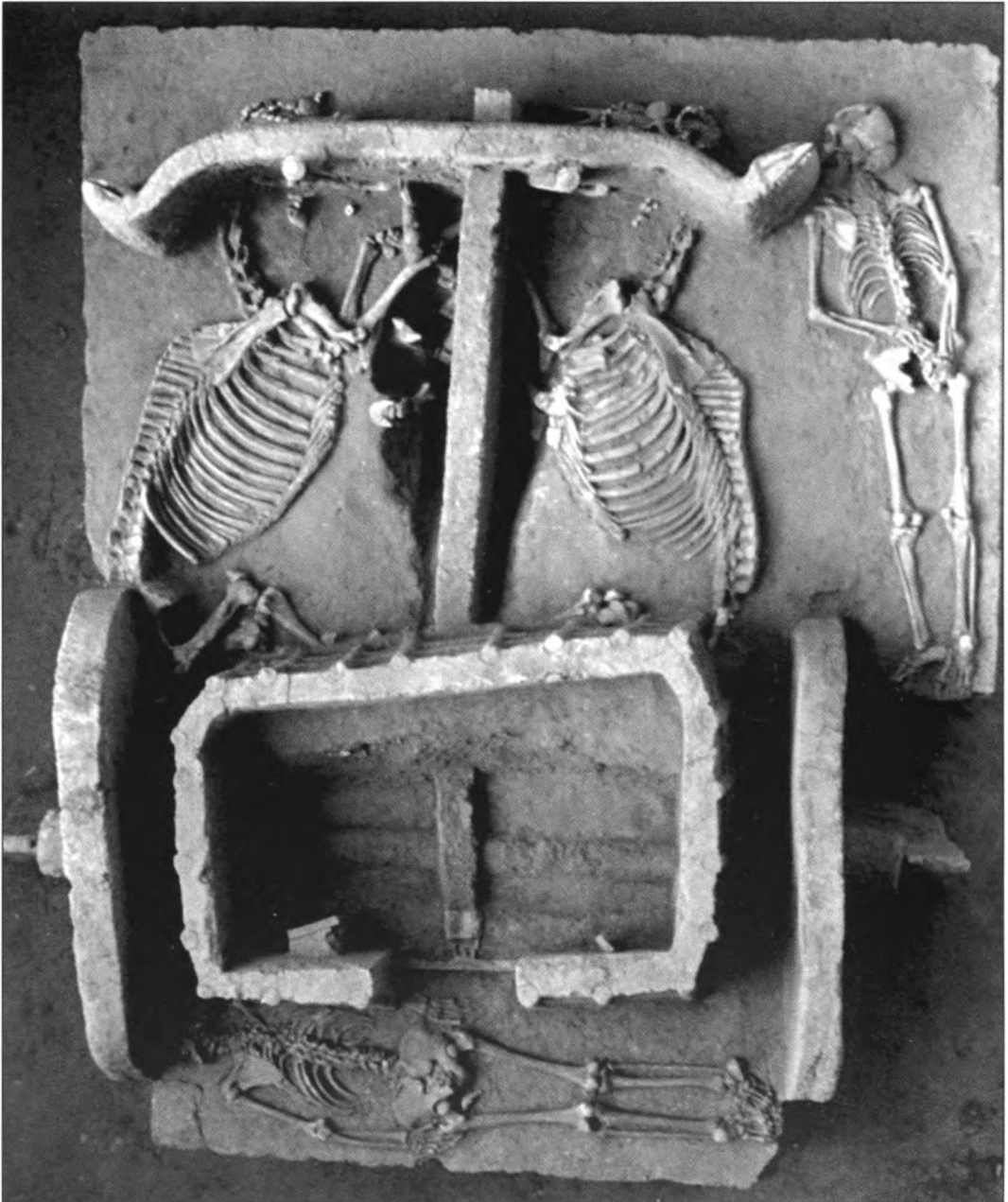


Figure 2.
Horse-chariot pit at the site of Guojiazhuang (Zhongguo shehui kexueyuan,
Kaogu yanjiusuo, Anyang dui [Anyang Station, Institute for Archaeology,
Chinese Academy of Social Sciences], 1988).

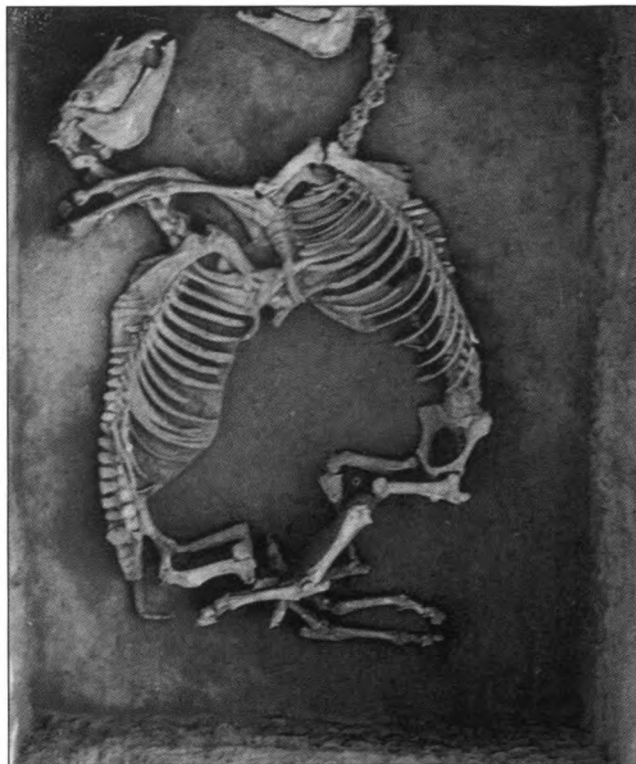


Figure 3.

Pit 36, containing two horses, at the Shang dynasty site of Yinxu, the "ruins of Yin." (Zhongguo shehui kexueyuan, Kaogu yanjiusuo [Institute for Archaeology, Chinese Academy of Social Sciences], 1994).

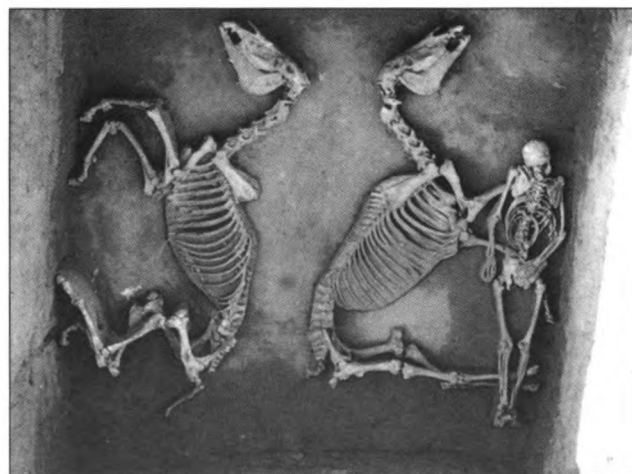


Figure 4.

Pit 41, containing a man and a pair of horses, at the Shang dynasty site of Yinxu. (Zhongguo shehui kexueyuan, Kaogu yanjiusuo, Anyang dui [Anyang Station, Institute for Archaeology, Chinese Academy of Social Sciences], 1987).

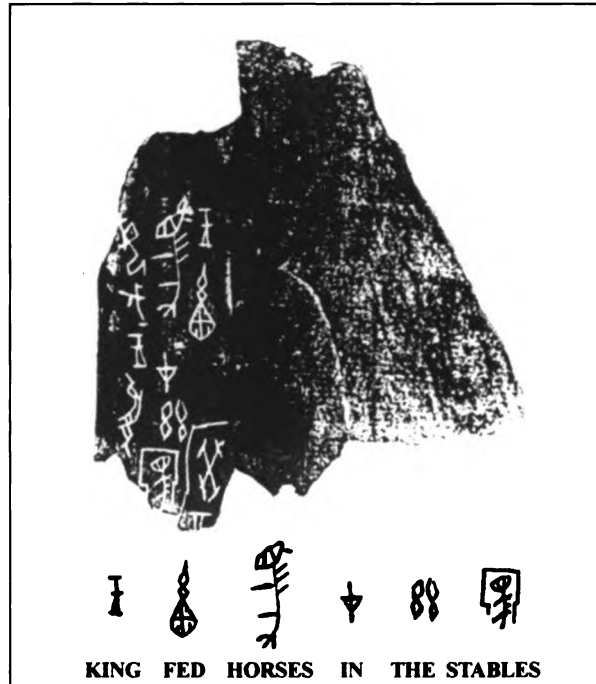


Figure 5.

Oracle bone with inscription: "The king fed horses in the stables."
(Zhongguo shehui kexueyuan, Lishi yanjiusuo [Institute for History,
Chinese Academy of Social Sciences], 1981).

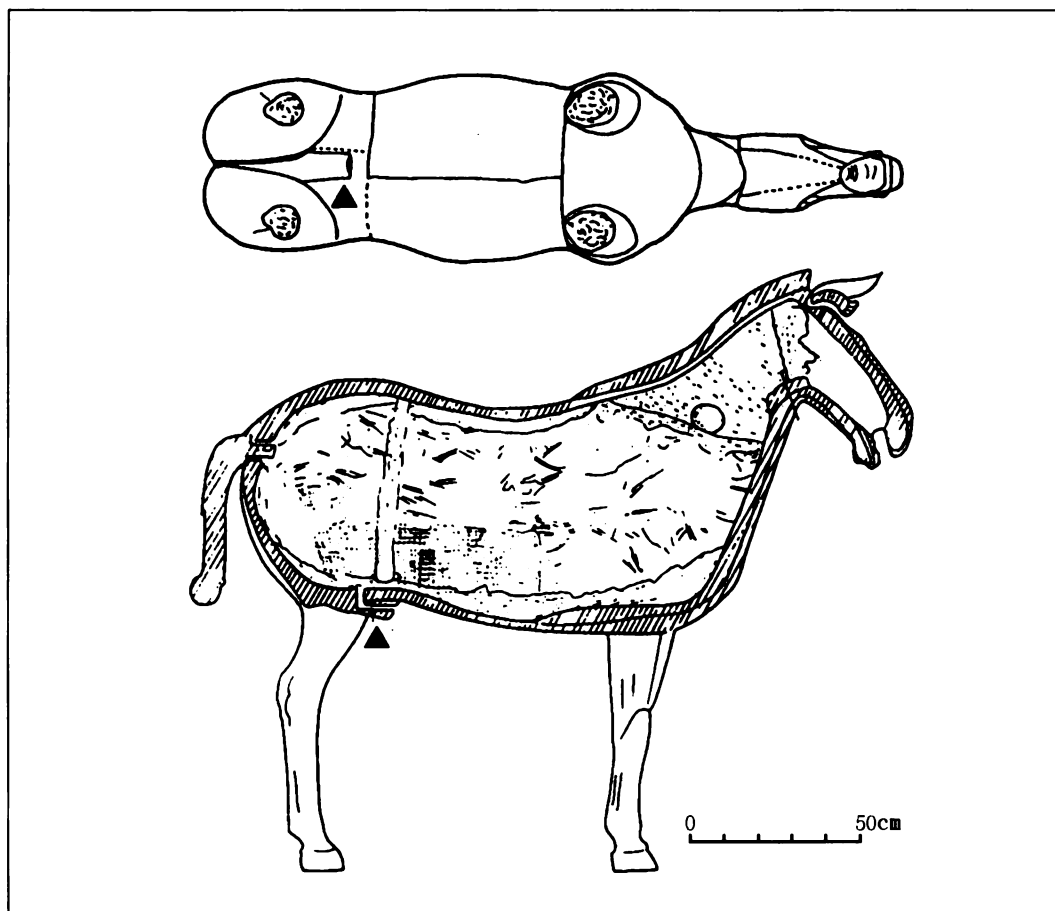


Figure 6.1.
Side view and bottom view of a chariot-pulling horse.
▲ indicates characteristic sign of castration

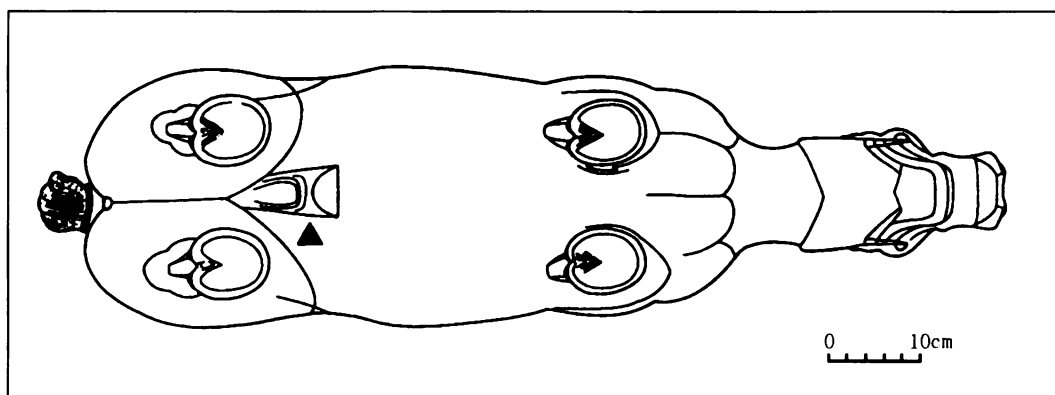


Figure 6.2.
Inferior view of a bronze horse.
▲ indicates characteristic sign of castration



Figure 7.1.
Male pommel horse.

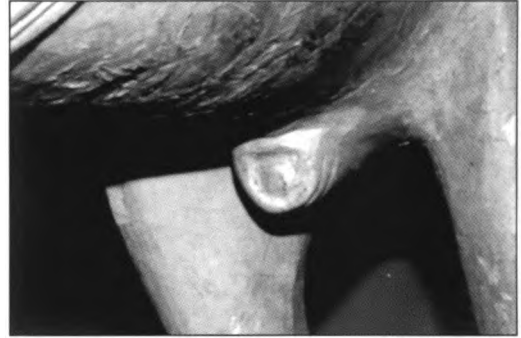


Figure 7.2.
Castrated male pommel horse.

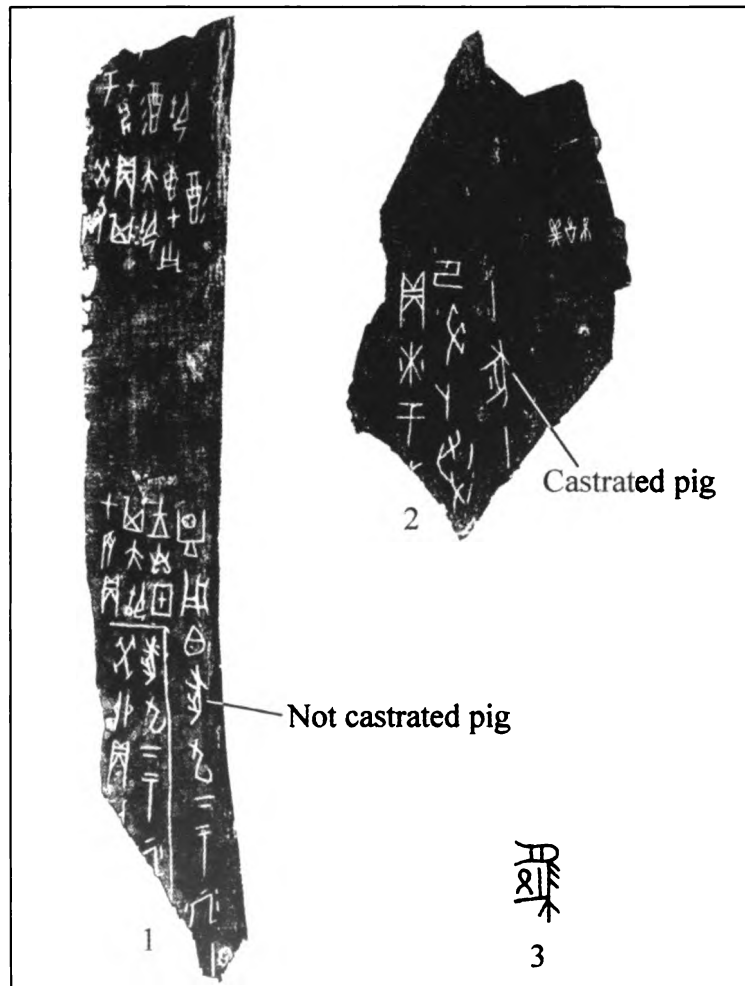


Figure 8: Oracle bone inscriptions that may indicate animal castration. 8.1 includes character for uncastrated pigs (jia) (inscription found in Guo Moruo, ed. *Jiaguwen heji*, No. 34103 and Yao Xiaosui and Xiao Ding, eds. *Yinxu jiagu keci leizuan*, Vol. 3, Y1313.1). 8.2 includes a character for castrated pigs that is found on numerous inscribed oracle bones (see Y616.1). 8.3 is a character that might indicate horse castration (found on Heji 11051, transliterated as an unknown character in Y628.1).

The Earliest Use of Iron in China

by

Donald B. Wagner

1. The state of the question¹

Over the centuries there have been a number of studies of when iron was first used in China, but until the 1950 s the only basis for a discussion of the question was in written texts.² Perhaps the most important textual evidence is a passage in the *Mencius*, a text of the late 4th or early 3rd century B.C., in which it becomes clear that iron implements for tilling and metal pots for cooking were essential parts of peasant life.³ Mentions of iron before this are rare, and in each case coupled with serious problems concerning the interpretation, authenticity, or dating of the text in question.⁴

¹ This article is part of a larger project, the volume on Ferrous Metallurgy for Joseph Needham's *Science and civilisation in China*. Support from the Nordic Institute of Asian Studies, the Danish Research Council for the Humanities, the Carlsberg Foundation, the University of Copenhagen, the Julie von Müllen Foundation, the Needham Research Institute, the Leverhulme Trust, and the Technical University of Berlin is gratefully acknowledged. I have received advice on earlier versions from so many persons that I cannot list them here, but I remain responsible for all remaining errors, misunderstandings, and infelicities of expression.

² Modern studies include Zhu Xizu, "Zhongguo gudai tie-zhi bingqi xian xing yu nanfang kao (The first use of iron weapons in China was in the south)," *Qinghua xuebao* 5.1 (1928), 1475–487; Fei Si, "Yong tie shidai wenti de yanjiu (The question of the date of the first use of iron)," *Shihuo* 2.2 (1935), 299–306; Li Hengde, "Zhongguo lishi shang de gangtie yejin jishu (Ferrous metallurgy in Chinese history)," *Ziran kexue* 1.7 (1951), 591–98; Sekino Takeshi, "Chūgoku shoki tekki bunka no ichi kōsatsu (An investigation of early iron Age culture in China)," *Shigaku zasshi* 60.10 (1951), 867–907; Ruan Hongyi, "Cong yejin de guandian shilun Zhongguo yong tie de shidai wenti (The date of the earliest use of iron in China from a metallurgical viewpoint)," *Wenshizhe* 1955.6, 1796–97; Yu Yi, "Dong Zhou kaogu shang de yige wenti (A problem in Eastern Zhou archaeology)," *WW* [see list of journal title abbreviations, before the References at the end of the article] 1959.8, 64–65; Li Xueqin, "Guanyu Dong Zhou tieqi de wenti (On the problem of iron artefacts of the Eastern Zhou period)," *WW* 1959.12, 69; Yin Difei "Shilun Dong Zhou shiqi de tie nongju (On iron agricultural implements of the Eastern Zhou period)," *Anhui shixue tongxun* 1959.4/5, 29–46; Guo Moruo, *Nuli zhi shidai* (Beijing: Renmin, 1973 [1954]), 202–7; Huang Zhanyue, "Jinnian chutu de Zhanguo liang Han tieqi (Recently discovered iron artefacts of the Warring States and Han periods)," *KGXB* 1957.3, 93–108; Yang Kuan, *Zhongguo gudai yetie jishu fazhan shi* (Shanghai: Renmin, 1982), 17–24; Tang Jigen, "Zhongguo yetieshu de qi yuan wenti (The question of the origin of iron smelting in China)" *KG* 1993.6, 556–65; 553; Bennet Bronson, "The transition to iron in ancient China," in Vincent C. Pigott, ed. *The Archaeometallurgy of the Asian Old World* (Philadelphia: University Museum, University of Pennsylvania, 1999), 177–93.

³ *Mengzi* 孟子, *juan* 5, Yang Bojun, ed. *Mengzi yizhu* (Beijing: Zhonghua, 1984 [1960]), 123–24; tr. D. C. Lau, *Mencius* (Harmondsworth: Penguin Books, 1970), 101; Donald B. Wagner, *Iron and Steel in Ancient China* (Leiden: Brill, 1993), 147–48.

⁴ The problems are discussed by e.g. Huang Zhanyue, "Guanyu Zhongguo kaishi yetie he shiyong tieqi de wenti (On the problem of the first smelting of iron and use of iron implements in China)," *WW* 1976.8, 62–70; Tang Jigen, "Zhongguo yetieshu de qi yuan wenti," Wagner, *Iron and Steel in Ancient China*, 52–60.

The terms of the debate on China's earliest iron were changed irrevocably by excavations in 1950–52 in Hui County 輝縣, Henan.⁵ Of 54 graves excavated here from the period of the Warring States (in the 5th–3rd century B.C.), seven yielded a total of 161 iron artefacts, including decorative objects, weapons, and implements. In 1953 there was another major find: the site of an iron foundry of the 3rd century B.C. in Xinglong County 興隆縣, Hebei,⁶ where cast-iron moulds for iron implements were found. More surprises were to come as these and other iron artefacts were subjected to metallographic examination, but the finding of large amounts of iron securely dated as early as the 4th century B.C. was remarkable enough in itself.

Guo Moruo responded to the new finds in an article entitled, "In hope of more finds of ancient iron."⁷ Here he reiterated his view that the transition from "slave society" to "feudal society" occurred at the beginning of the 5th century B.C., and suggested that more finds of iron artefacts would strengthen this hypothesis.

In the next few years excavations revealed more and more early iron artefacts. In 1957 the archaeologist Huang Zhanyue concluded the first systematic survey of these with a bitter complaint concerning, among other matters, the lack of rigour, or even total lack of basis, of many of the dates given for the artefacts he was interested in.⁸ Such outspoken criticism of colleagues is rare in the Chinese scholarly literature, but it had its justification in this case. Much has since changed for the better, but it is still true that historians who wish to use Chinese archaeological material in their work must not blindly accept dates and other interpretations given by the excavators of material of interest, but find out how other Chinese archaeologists have received these claims, as well as looking critically themselves at the basis on which the claims are made.

With the publication of still more relevant archaeological material, many scholars have been attracted to the question of the origin of the use of iron in China. It was again Huang Zhanyue who, in an important article published in 1976, brought order to a confusion of claims and counter-claims.⁹ Using rigorous philological criteria he rejected, one by one, all of the arguments based on written sources. Considering then the archaeological evidence, he rejected several arguments on such grounds as methodological confusion, incorrect dating, or inadequate reporting of excavation details. He concluded that the first use of iron in China was in the south, for the earliest iron artefacts so far found in China were from Changsha, Hunan (in the state of Chu 楚) and Luhe 六合, Jiangsu (in what was then the ancient state of Wu 吳).

⁵ Excavation report, Anon. 1956 (*Huixian fajue baogao* [Excavations in Hui County, Henan], Beijing: Kexue); see also An Zhimin, "Zhongguo kaoguxue de xin qidian – jinian Huixian fajue sishi nian (The new starting point of Chinese archaeology: the fortieth anniversary of the Hui County excavations)," *WWTD* 1990.5, 30–34; Madeleine Paul-David, "Les fouilles de Houei-hien," *Arts asiatiques* 1.2 (1954), 157–60; Wagner, *Iron and Steel in Ancient China*, 199–206; Zhang Xinbin, "Huixian Guweicun Zhanguo mu guobie wenti taolun (On the state to which the Warring States period tombs at Guweicun in Huixian, Henan, belong)," *ZYWW* 1994.2, 90–96.

⁶ Excavation report, Zheng Shaozong, "Rehe Xinglong faxian de Zhanguo shengchan gongju zhufan (Moulds for casting production implements discovered at a Warring States period site in Xinglong County, Rehe)," *Kaogu tongxun* 1956.1, 29–35; pl. 9–10; see also Anon. 1980 (*Hebei sheng chutu wenwu xuanji* [Selected cultural relics unearthed in the province of Hebei] [Beijing: Wenwu, 1980]; Li Xueqin, *Eastern Zhou and Qin civilizations* (New Haven & London: Yale University Press, 1985), 327.

⁷ Orig. 1956, repr. Guo Moruo, *Nuli zhi shidai*, 2nd ed. (Beijing: Renmin, 1973), 202–207.

⁸ Huang Zhanyue, "Jinnian chutu de Zhanguo liang Han tieqi," 104.

⁹ Huang Zhanyue, "Guanyu Zhongguo kaishi yetie he shiyong tieqi de wenti."

When in the mid-1980's I wrote my own contribution to the problem, in two chapters of a book entitled *Iron and Steel in Ancient China*, the available archaeological material appeared to provide a moderately clear picture.¹⁰ Several artefacts of *meteoritic* iron from the late Shang and early Western Zhou found in north China seemed irrelevant to later developments; and if one ignored claims that were not properly documented with archaeological and metallurgical details, it seemed that in China the *smelting* of iron from ore began, as Huang Zhanyue had suggested, in the south, sometime before the beginning of the 5th century B.C. I felt, however, that I could narrow this further, to the state of Wu 吳.¹¹ From there it spread within a century to the other major southern state, Chu 楚, and within another century to the rest of the Zhou realm, almost entirely replacing bronze as the metal of choice for most practical implements and weapons. Earlier iron artefacts of non-Chinese peoples on the periphery of the Zhou realm (which I did not mention) appeared interesting but essentially irrelevant to the Chinese story: the rulers of the Zhou states had sufficient bronze for their purposes, and if they were aware of the new metal used by their northern neighbours they found it a poor substitute.

However, even as that book was being printed, new publications of archaeological material were undermining its story. What is available as I write (April 2004) indicates that smelted iron definitely was in use in northwest China long before it was used in the south. A direct implication is that the technique of iron smelting came to northwest China from the West, for contacts with iron-using peoples on the periphery of the Zhou realm were sufficiently intense that independent invention was hardly possible. Another surprising aspect of the new archaeological material is that it indicates that the early smiths may have used meteoritic and smelted iron interchangeably, so that the meteoritic iron artefacts have a significance which I had not earlier been willing to accept.

If iron-smelting technology came to China from the West, then the first iron smelting in China must have been done in bloomeries rather than, as a few writers (including myself) have assumed, in blast furnaces. The bloomery is a small-scale hearth or shaft furnace which produces wrought iron in the solid state.¹²

2. Iron on the periphery of the Zhou realm

In recent years, some surprisingly early dates for iron have been published from

¹⁰ Wagner, *Iron and Steel in Ancient China*, 51–146.

¹¹ In this I largely followed Huang Zhanyue. However, after his article was published, the new excavations of the Chu capital in Jiangling, Hubei, had discredited certain assumptions on which the dating of the Changsha material had been based; see Wagner, "The dating of the Chu graves of Changsha: The earliest iron artifacts in China?" *Acta Orientalia* 48 (1987), 111–56; Wagner, *Iron and Steel in Ancient China*, 86–90; Zhou Shirong, "Jiantan Hunan de Chu wenhua (On Chu culture in Hunan)," *ZYWW* 1990.2, 85–88. With the Changsha material essentially undatable, this put the use of iron in Chu at least a century later than in Wu. Note that Han Rubin ("Zhongguo zaoqi tieqi [Gongyuan qian 5 shiji yiqian] de jinxiangxue yanjiu [Metallographic examination of Chinese iron artefacts earlier than the 5th century B.C.]," *WW* 1998.2, 91) continues to follow the older chronology for the Changsha graves.

¹² Out of the vast literature available on the archaeological, historical, theoretical, and experimental aspects of bloomery iron smelting, the best single reference is now Radomir Pleiner's magisterial *Iron in Archaeology: The European Bloomery Smelters* (2000).

Xinjiang, in the far northwest of modern China.¹³ Iron is found in graves which for the most part show no sign at all of Chinese influence and which have surprisingly early radiocarbon dates. The most important early iron artefact type appears to be a small knife; a few examples are shown in Figure 1. Chen Ge gives a table of 35 radiocarbon dates (by three different laboratories) for graves in Xinjiang in which iron artefacts were found.¹⁴ The dates can be summarised as follows:

before 1000 B.C.	1
B.C. 1000–901	3
900–801	6
800–701	7
700–601	3
600–501	5
500–401	2
400–301	2
300–201	1
200–101	2
later	3

There seems to be little room for doubt that iron was known here by the 8th century B.C. and possibly the 9th, but I would tend to be wary of the dates which are earlier than this, for they are difficult to fit in with what we know of iron in Central Asia and the West. They are best explained as the tail of the Gaussian distribution of radiocarbon dates of the 8th century B.C. The region seems not to have had much contact with the Central Plain before the Han period.

There are also some early dates for iron in parts of Gansu, perhaps again pointing

¹³ See especially Mei Jianjun, *Copper and Bronze Metallurgy in Late Prehistoric Xinjiang: Its Cultural Context and Relationship with Neighbouring Regions* (Oxford: Archaeopress, 2000), 15–24; Chen Kwang-tzuu & Fredrik T. Hiebert, "The late prehistory of Xinjiang in relation to its neighbors," *Journal of world prehistory*, 9.2 (1995), 243–300; Chen Ge, "Xinjiang chutu de zaoqi tieqi – jiantan woguo kaishi shiyong tieqi de shijian wenti (Early iron artefacts unearthed in Xinjiang: With a note on the earliest use of iron in China)," in *Su Bingqi 1989 (Su Bingqi Kaogu wushiwu nian lunwenji* [Beijing: Wenwu, 1989]), 425–32; also "Pamier gaoyuan gu mu (Ancient tombs on the Pamir Plateau)," *KGXB* 1981.2, 199–216; also Chen Ge, "Guanyu Xinjiang xin shiqi shidai wenhua de xin renshi (New insights on the Neolithic cultures of Xinjiang)," *KG* 1987.4, 343–51; 322; and "Guanyu Xinjiang diqu de qingtong shidai he zaoqi tieqi shidai wenhua (The Bronze Age and Early Iron Age culture in Xinjiang)," *KG* 1990.4, 366–74; Cong Dexin & Chen Ge, "Xinjiang Luntai xian Qunbake muzang di er, san ci fajue jianbao (2nd and 3rd excavation seasons of graves at Qunbake in Luntai County, Xinjiang)," *KG* 1991.8, 684–703; 736; pl. 1–3.; Sun Binggen & Chen Ge, "Xinjiang Luntai Qunbake gu muzang di-yi-ci fajue jianbao (Second season of excavations of ancient graves at Qunbake in Luntai County, Xinjiang)," *KG* 1987.11, 987–96; pl. 3–5; "Xinjiang Hejing xian Chawuhugoukou yi-hao mudi (Cemetery no. 1 at Chawuhu Pass, Hejing County, Xinjiang)," *KGXB* 1988.1, 75–98; pl. 7–16; Zhang Ping, a.o., "Xinjiang Hami Yanbulake mudi (The Yanbulake Cemetery in Hami, Xinjiang)," *KGXB* 1989.3, 325–62; plates 7–14; Zhang Yuzhong, "Wulumuqi shi Nanshan Kuangqu gu muzang (Ancient tombs in the Nanshan Mining Region, Urumchi Municipality, Xinjiang)" in Anon. 1984a, *Zhongguo kaoguxue nianjian* 1984 (Beijing: Wenwu, 1984), 256; Corinne Debaine-Francfort, "Archéologie du Xinjiang des origines aux Han. IIème partie: L'âge du fer," *Paléorient*, 15.1 (1989), esp. pp. 192, 194, 196–7, 198, 201, 206–7; Wu En, "Zhukaigou wenhua de faxian ji qi yiyi (The discovery of the Zhukaigou Culture and its significance)," in Wang Weiji & Zhang Yumei, eds., *Zhongguo kaoguxue luncong* (Beijing: Kexue, 1993); Zhang Yuzhong, "Xinjiang kaogu shulüe (A survey of Xinjiang archaeology)," *KG* 2002.6, 487–90.

¹⁴ Chen Ge, "Xinjiang chutu de zaoqi tieqi," 426–27.

to a date in the 8th century B.C. for iron.¹⁵ Here, there are more signs of contact with the Central Plain.

How did the technology of iron smelting reach Xinjiang? In an earlier article I pointed to Scythic nomadic cultures in the steppelands as likely intermediaries.¹⁶ The Scythians – *Saka* in Persian sources,¹⁷ Sai 塞 (Archaic *sək* or *səg*)¹⁸ in Chinese sources – dominated the steppelands of Inner Eurasia through the greater part of the 1st millennium B.C., were extremely mobile, and were the carriers of many cultural influences between East and West.¹⁹ There are definite signs of Scythian influence in Xinjiang very early on,²⁰ and iron metallurgy is taken as one of the diagnostic features of “Scythic culture” by a number of authors.²¹ However, firm dates for iron metallurgy in the eastern steppelands are not as early as for iron in Xinjiang. Iron may have been used very early at the western end of the distribution of Scythic cultures, but east of the Urals the earliest firmly dated Scythic iron appears to come from kurgans (grave mounds) excavated in Tuva and dated to the 7th century B.C.²² A major study of ancient nomadic cultures of the Northern Zone of China by Wu En also places the earliest iron in the steppelands in the 7th century B.C.²³

¹⁵ Pu Chaofu, “Gansu Yongdeng Yushugou de Shajing muzang (Graves of the Shajing Culture at Yushugou in Yongdeng County, Gansu),” *KGYWW* 1981.4, 34–36; plates 5–6; Pu Chaofu & Zhao Jianlong, “Gansu Yongchang Sanjiaocheng Shajing wenhua yizhi diaocha (Investigation of a site of the Shajing Culture at Sanjiaocheng in Yongchang County, Gansu),” *KG* 1984.7, 598–601; cf. Chen Ge, “Xinjiang chutu de zaoqi tieqi,” 431.

¹⁶ Wagner, “The earliest use of iron in China.” In S. M. M. Young et al., eds., *Metals in Antiquity* (Oxford: Archaeopress, 1999), 1–13.

¹⁷ Leonid T. Yablonsky, “Written sources and the history of archaeological studies of the Saka in Central Asia,” in Jeannine Davis-Kimball et al., *Nomads of the Eurasian Steppes in the Early Iron Age* (Berkeley: Zinat Press, 1995), 193–200.

¹⁸ Karlgren, “Grammata Serica recensa,” *BMFEA* 29 (1957), item 908a.

¹⁹ “The ‘Scythic era,’ 1000–200 BCE,” David Christian, *A History of Russia, Central Asia and Mongolia* (Oxford: Blackwell, 1998), ch. 6: 123–62; Nicola Di Cosmo, *Ancient China and its Enemies: The Rise of Nomadic Power in East Asian History* (Cambridge: Cambridge University Press, 2002), 31–43; Konstantin Marčenko & Yuri Vinogradov, “The Scythian period in the northern Black Sea region (750–250 BC),” *Antiquity* 63.241 (1989): 803–13.

²⁰ Mei Jianjun, *Copper and Bronze Metallurgy in Late Prehistoric Xinjiang*, 69–71; Wang Binghua, “Recherches historiques préliminaires sur les Saka du Xinjiang ancien,” *Arts asiatiques* 42 (1987), 31–44; Corinne Debaine-Francfort, “Archéologie du Xinjiang des origines aux Han. IIème partie: L’âge du fer,” *Paléorient* 15.1 (1989), 198–201; Ma Yong & Wang Binghua, “The culture of the Xinjiang region,” in J. Harmatta, ed., *History of Civilizations of Central Asia*. Vol. 2 (Paris: UNESCO Publishing, 1994), 209–25; Chen & Hiebert, “The late prehistory of Xinjiang,” N. Di Cosmo, “The northern frontier in pre-Imperial China,” in Michael Loewe & Edward L. Shaughnessy, eds., *The Cambridge History of Ancient China: From the Origins of Civilization to 221 B.C.* (Cambridge: Cambridge University Press, 1999), 924–6.

²¹ William Watson, *Cultural Frontiers in Ancient East Asia* (Edinburgh: Edinburgh University Press, 1971), 109; Christian, *A History of Russia, Central Asia and Mongolia*, 127.

²² Davis-Kimball et al., *Nomads of the Eurasian Steppes in the Early Iron Age* (Berkeley: Zinat Press, 1995): 5–82, 276, 324; R. Kenk, *Grabfunde der Skythenzeit aus Tuva, Süd-Sibirien: Unter Zugrundelegung der Arbeit von A. D. Grač* (München: Beck, 1986), 15–19, 75, 89, 99; V. Semenov & M. Kilunovskaya, “New archaeological material of the early Iron Age from Tuva” (International Association for the Study of the Cultures of Central Asia: Information Bulletin [Moscow: UNESCO/Nauka], 17 (1990), 44–56; Chugunov et al., “Study of the ‘Tsar’ burial mound Arzhan-2 in Tuva,” in *Impact of the Environment on Human Migration in Eurasia* (St. Petersburg: The State Hermitage Museum et al., 2003); and “An elite burial of the period of early nomads in Tyva,” *Archaeology ethnology & anthropology of Eurasia* 2.10 (2002), 115–26. But note that Mark E. Hall (“Towards an absolute chronology for the Iron Age of Inner Asia,” *Antiquity* 71.274 [1997], 863–74) and Di Cosmo (“The northern frontier in pre-Imperial China,” 914) give somewhat earlier dates for iron in Tuva.

²³ Wu En, “Ou-Ya dalu caoyuan zaoqi youmu wenhua de jidian sikao (Some ideas on the early nomadic culture in the Eurasian steppe),” *KGBX* 2002.4, 443.

Archaeological material available at this writing suggests that iron technology came to Xinjiang from the Chust culture of the Ferghana Valley, in modern Uzbekistan. Here iron appears at the beginning of the 1st millennium B.C., and there is solid evidence of mutual influence between this culture and several cultures of southern Xinjiang.²⁴

Farther east, in the Russian Maritime Province, some scholars believe that the use of iron was much earlier, perhaps as early as the 12th century B.C. This claim seems to be based on a single radiocarbon date, and should therefore be treated with extreme caution until such a time as more solid evidence becomes available.²⁵

It seems reasonable to conclude that the technology of iron smelting came to Xinjiang from the West. Given the present state of Inner Eurasian archaeology, however, further speculation concerning the precise route by which this transmission took place would be unwise. On the other hand, transmission to the Central Plain from Xinjiang through Gansu seems uncontroversial.

Early iron in Korea

There is some evidence that Korean iron technology may have come from the Scythians, and that this could have been as early as the 8th or 7th century B.C. There is considerable controversy concerning the date of the first use of iron in Korea.²⁶ Sarah Taylor notes that the dates which have been proposed range from the 8th to the 3rd century B.C.²⁷ Yoon Dong-Suk cites (and dismisses) Lee Byōng-sōn's statement that "the early iron age along the Yalu River had begun as early as the

²⁴ Mei Jianjun, *Copper and Bronze Metallurgy in Late Prehistoric Xinjiang*, 67–70; Askarov, "The beginning of the Iron Age in Transoxania," in A. H. Dani & V. M. Masson, eds., *History of Central Asia*, Vol. 1 (Paris: UNESCO Publishing, 1992), 447–51. Note also N. G. Gorbunova, *The Culture of Ancient Ferghana: VI century B.C.–VI century A.D.* (Oxford: BAR [British Archaeological Reports], 1986), 18–21.

²⁵ Chester Chard (*Northeast Asia in Prehistory* [Madison: University of Wisconsin Press, 1974], 94) writes: "Iron appears in the Vladivostok area in the eleventh to twelfth centuries B.C., coinciding with the development of the so-called Shell Mound or Sidemi culture." Okladnikov (*The Soviet Far East in Antiquity: An archaeological and historical study of the maritime region of the U.S.S.R.* [Toronto: University of Toronto Press, 1965]), 184–242) discusses the Shell Mound culture in detail, but does not mention early iron artefacts. Murakami Kyōtō ("Dongbei-Ya de zaoqi tieqi shidai [The Early Iron Age in Northeast Asia]," *BFWW* 1991.1, 94–101) mentions the iron artefacts of this culture, but does not take them seriously. See Chard, "First radiocarbon dates from the U.S.S.R.," *Arctic Anthropology* 1.1 (1961), 85, item 21, RUL-165; Di Cosmo, "The northern frontier in pre-Imperial China," 913; *Ancient China and its Enemies*, 72–73; A. P. Derevianko, "New data on the archaeology of the Middle Amur," *Arctic Anthropology* 3.1 (1965), 138–39; Wang Dehou (trans.), "Amuerhe yanyan zaoqi tieqi shidai he zhongshiji de wenhua [The early Iron Age of the Amur River region and Medieval culture]," *BFWW* 1999.3, 104–109. I am grateful to Sarah M. Nelson and Charles T. Keally for several of these references.

²⁶ On iron in ancient Korea see Yoon Dong-Suk, *Metallurgical Study of the Early Iron Age Artifacts Found in Korea* ([Seoul]: Pohang Iron and Steel Co, 1984), 35–46. Note also Sarah Taylor, "Ploughshares into Swords: The iron industry and social development in protohistoric Korea and Japan" (Ph.D. dissertation, Cambridge University, 1990), 213–15; Gina L. Barnes, *China, Korea and Japan: The Rise of Civilization in East Asia* (London: Thames and Hudson, 1993), 214; Zhao Zhiwen (trans.), "Chaoxian bandao chuqi tieqi wenhua de xingcheng he fazhan guocheng [The formation and development of early iron-using cultures on the Korean peninsula]," *HXXG* 1996.1, 97–112. There are also claims of very early iron in Manchuria, 8th century B.C. or even earlier, but I tend to be skeptical of the dates given (Di Cosmo, *Ancient China and its Enemies*, 64–65).

²⁷ Sarah Taylor, "The introduction and development of iron production in Korea: A survey," *WA* 20.3 (1989), 422, 427; cf. Taylor, "Ploughshares into Swords," 34–6, 42; Sarah M. Nelson, *The Archaeology of Korea* (Cambridge: Cambridge University Press, 1993), 172–74.

7th century B.C.”²⁸ The early dates come from the North, and it appears that North Korean archaeology is not always taken seriously in South Korea or in the West: “The very early dates suggested by North Korean scholars (seventh or eighth centuries BC, i.e. before the first firmly dated iron production in China) seem motivated by nationalism as much as anything else, though it is often difficult to gain access to the data on which they base these claims.”²⁹ I must leave the discussion of the merits of North Korean archaeology in general, and of these claims in particular, to those who have access to the relevant publications, can read them, and have the necessary expertise to evaluate their reasoning. But it is important to repeat that the first iron in Korea need not have come from China. Scytho-Siberian influences are known in South Korea, albeit at later dates than are relevant here (e.g. the Ipsil-ni 入室里 site, Kyoŋju, dated to the late 3rd century B.C.),³⁰ and we should expect to find the earliest such influences in the north. Yoon Dong-Suk cites with approval the statement that “in the northeastern sector of the Peninsula, the early iron age culture had already started on or about the 4th century BC by not only Chinese influences but also Siberian, particularly along the Tuman River Basin.”³¹

The best evidence on the actual technology of iron smelting in early Korea seems to be the bloomeries used in later times in Japan; this technology is generally assumed to have been imported from Korea. Hashiguchi Tatsuya reproduces diagrams of two iron-production sites in Kyūshū 九州, but gives no explanation.³² One of these, his figure 1, excavated in Fukuoka 福岡, is fascinating, for it appears to show an odd type of bloomery which might be an early ancestor of the traditional Japanese *tatara* 踏鞴 furnace.³³ It is dated 7th to 8th century A.D., and if this is indeed a bloomery it may be the earliest so far excavated and published anywhere in East Asia. It shows that bloomeries were in use in early times in the Korea–Japan area. Its peculiar construction may have been developed in Korea or Japan in response to the technical problems caused by the use of ironsand ore; such problems have been observed in 18th-century American bloomeries and in 20th-century Chinese traditional “dwarf” blast furnaces.³⁴

3. Early Chinese meteoritic and smelted iron

The earliest evidence of the use of iron in the Central Plain is shown in Figures 2–4. These are bronze axeheads of several kinds with cast-in edges of meteoritic iron,

²⁸ Yi Pyōng-sŏn 1967 (cited Yoon, *Metallurgical Study of the Early Iron Age Artifacts Found in Korea*, 69).

²⁹ Taylor, “The introduction and development of iron production in Korea,” 427; “Ploughshares into Swords,” 34.

³⁰ Kim Jeong-hak, *The Prehistory of Korea* (Honolulu: University Press of Hawaii, 1978), 138–40.

³¹ Tho Yu-ho 1960 (cited Yoon, *Metallurgical Study of the Early Iron Age Artifacts Found in Korea*, 69).

³² Hashiguchi Tatsuya, “Gudai Jiuzhou de yetie shengchan (Iron production in ancient Kyūshū, Japan),” *HXXG* 1992.4, 99–100.

³³ On which see e.g. Rostoker et al., “Smelting to steel by the Japanese *tatara* process,” *Archeomaterials* 3.1 (1989), 11–25.

³⁴ Henry Horne, *Essays Concerning Iron and Steel* (London: T. Cadell, 1773); Wagner, *Dabieshan: Traditional Chinese iron-production techniques practised in southern Henan in the twentieth century* (London & Malmö: Curzon Press, 1985), 17, 38, 55, 57.

and all seem likely to be of the Shang or early Western Zhou period.³⁵ Until recently it seemed reasonable to ignore such artefacts as essentially irrelevant to the later development of iron smelting in China. Noel Barnard, writing in the early 1970 s, put the argument as follows:

Until the opportunity occurs to write at greater length on the subject I would simply observe here that the presence of meteoric iron in shaped form – particularly the FGA items (34.11) [Freer Gallery of Art; see Figure 2] with dovetail cutting of the iron blade – must indicate an alien source of origin. Such articles would have entered the Middle States' area as the result of occasional contacts with nomadic peoples far to the west and beyond the present boundaries of China. There is no evidence at all which would allow us to assume that these meteoric iron blades could have been worked by Chinese artisans in Shang and Western Chou times. On the contrary, one might now point to this early evidence of the metal iron in China and comment on the fact that its introduction (a) made absolutely no impact on current and later metallurgical technology (i.e. smithy work did not develop), and (b) had nothing to do with the Chinese discovery of cast-iron some five or six centuries later. The unusual articles were simply treated as a curiosity.³⁶

There was at this time no evidence that smithy techniques were ever used by early Chinese bronze artisans. Professor Barnard believed that if the techniques needed to shape wrought iron had been known to the bronze artisans, we should see evidence of this in the bronzes of the time. On this point I am not convinced. The techniques of the blacksmith are very different from those of the bronzesmith. Bronze is brittle when hot, and therefore forging must be done cold. Any metal hardens under cold-forging; if it becomes too hard before shaping is finished it must be softened by "annealing" – heating briefly to a red heat and cooling again. Wrought iron alloys – including meteoritic iron – can be shaped by the same technique of cold-forging and annealing, but since they are plastic when hot it is more efficient to shape them by forging at a red or white heat. There is good metallographic evidence that the iron parts of most or all of the artefacts shown in Figures 2–4 were hot-forged; the evidence is summarised in the figure captions. This technique, whether learned from outside or independently invented, would have been useless in shaping bronze.

The bronze parts of these artefacts are clearly Chinese in style, and there are also many similar Shang artefacts with cast-in *jade* cutting edges.³⁷ There is still room for the supposition that the iron parts were imports from elsewhere, but very little reason for it. More likely there were Chinese smiths in the Shang and early Zhou periods who hot-forged meteoritic iron and produced small edges to be cast into

³⁵ They are discussed further by Han Rubin, "Zhongguo zaoqi tieqi;" note also Chêng Tè-k'un, "New light on Shang China," *Antiquity* 49 (1975), 30–31.

³⁶ Noel Barnard & Satô Tamotsu, *Metallurgical Remains of Ancient China* (Tôkyô : Nichiôsha, 1975), 85, fn. 5, cf. pp. 67–8, fn. 80; see also Barnard, Review of Gettens et al. 1971, *Journal of the American Oriental Society* 93.4 (1973), 639–40.

³⁷ Wang Lin, "Cong jijian tong-bing yu-bing kan Shang-dai jinshu yu fei-jinshu de jiehe zhuzao jishu (Shang-period foundry techniques for joining metals and non-metals in the light of several bronze-jade weapons)," *KG* 1987.4, 363–64.

bronze axes and other edged weapons. Meteoritic iron is usually fairly hard, and these bronze-iron weapons are likely to have been superior to weapons of bronze alone, but meteoritic iron is so rare that these must always have been uncommon luxury items. We do not know whether these smiths developed their techniques themselves or learned them from elsewhere. The probability of independent invention seems high, but I have no information at all on the use of meteoritic iron in early Central Asia.³⁸

Bronze-iron artefacts of the state of Guo with smelted and meteoritic iron

The earliest artefacts of smelted iron from a clearly Chinese context were found in 1990–91 in the royal tombs of the minor state of Guo 虢, at present-day Sanmenxia, Henan Province, dated to the late 9th or early 8th century B.C.³⁹ These are the three bronze iron artefacts shown in Figures 5–7. Examination by Han Rubin and her group leaves no possibility of doubt that this iron is man-made.⁴⁰ It is very low in nickel and cobalt, which are always present in significant quantities in meteoritic iron, and metallographic examination of the badly corroded iron reveals inclusions whose form and composition are typical of slag inclusions in bloomery iron, but which would not be found in meteoritic iron.

The tombs are dated by the excavators to the period of the last two kings of the Western Zhou dynasty, Kings Xuan 宣 and You 幽 (827–771 B.C.), on the basis of comparison of numerous bronzes with bronzes from well-dated tombs elsewhere in China. In the past some Chinese authors have argued that all of the Guo tombs

³⁸ Some meteoritic iron artefacts are known from the Afanasievo Culture in the Minusinsk Basin and the Altai region, apparently to be dated before 2000 B.C. These are mentioned very briefly by Okladnikov ("Inner Asia at the dawn of history," in Denis Sinor, ed. *The Cambridge History of Early Inner Asia* [Cambridge: Cambridge University Press, 1990], 80), and by Mikhail P. Gryaznov (*Southern Siberia* [Geneva, Paris, & Munich: Nagel Publishers, 1969]), 27, 50, pl. 3) but neither gives any details or source references. It is interesting that Mei Jianjun (*Copper and Bronze Metallurgy in Late Prehistoric Xinjiang*, 58–9) finds evidence of contacts between this culture and early cultures in Xinjiang.

³⁹ The Guo tombs in Sanmenxia, discovered in 1956, have been excavated in a series of campaigns in 1956–7, 1990–92, and 1998–9. There is a considerable literature on these remarkable tombs: see especially Lin Shoujin, *Shangcunling Guo guo mudi: Huanghe shuiku baogao zhi san* (The cemetery of the state of Guo at Shang Ts'un Ling: Archaeological excavations at the Yellow River Reservoirs, Report no. 3) (Beijing: Kexue, 1959); "Shangcunling Guo guo mudi' buji" (Supplementary remarks to Lin Shoujin 1959), *KG* 1961.9, 505–7; "Shangcunling fajue de xueshu gongxian (Academic contributions of the excavation at Shang Ts'un Ling)," *Xianggang Zhongwen Daxue Zhongguo Wenhua Yanjiusuo xuebao* 9 (1978), (*shang* 上), 1–15 plates; 1–15; Lin Shou-chin, "Culture of the state of Guo," *CP* 1962.3, 10–13; Li Xueqin, *Dong Zhou yu Qin-dai wenming* (Eastern Zhou and Qin civilisation) (Beijing: Wenwu, 1984), 64–6; Li Xueqin, *Eastern Zhou and Qin civilizations* (1985), 80–84; Anon. 1984b (*Xin Zhongguo de kaogu faxian he yanjiu* [Beijing: Wenwu, 1984]), 283–5; Anon. 1991a (*Zhongguo wenwu dituji: Henan fence* [Beijing: Zhongguo Ditu, 1991]; Anon. 1999 (*Sanmenxia Guo guo mu* [The Guo state tombs in Sanmenxia] [Beijing: Wenwu, 1999]); Cai Yunzhang, "Lun Guo Zhong qi ren (On Guo Zhong, the person [buried in Tomb M2009 in Sanmenxia])," *ZYWW* 1994.2, 86–9; 100; "Guo Wen gong mu kao (On the tomb of Duke Wen of Guo [Tomb M2001 in Sanmenxia])," *ZYWW* 1994.3, 42–45; 94; "Guo guo de fenfeng yu wuge Guo guo de lishi jiuge (The enfeoffment of Guo and the historical confusion over five states named Guo)," *ZYWW* 1996.2, 69–76; Tang Shujun, "Guo guo mudi (The cemetery of the state of Guo in Sanmenxia, Henan)," *ZYWW* 1999.2, 118.

⁴⁰ Han Rubin et al., "Guo guo mu chutu tie-ren tong-qi de jianding yu yanjiu" (Appraisal and study of bronze artefacts with iron blades from tombs of the state of Guo)," in Anon. 1999, *Sanmenxia Guo guo mu* (The Guo state tombs in Sanmenxia) (Beijing: Wenwu, 1999), 570.

excavated in the Sanmenxia area must be dated later than 770 B.C.,⁴¹ while others have disagreed.⁴² It is likely that the new excavations have laid this question to rest, but in any case, even if a much later date were supposed, these three artefacts would still be the earliest man-made iron artefacts so far found in a Chinese context.

Meteoritic iron was also found here. The three bronze iron artefacts shown in Figures 8–10 are from the same tomb as that in Figure 7, which is of smelted iron, but the iron parts of these have very high nickel contents, and therefore are almost surely of meteoritic iron.⁴³ High nickel content in smelted iron can occur, though it rarely does, and certainty on this question is possible only if metallographic examination shows the remains of a Widmanstätten structure, as in the meteoritic artefacts discussed earlier (Figures 2–4).⁴⁴ However, too little metallic iron was left in the badly corroded Guo artefacts to allow a meaningful metallographic examination. Therefore a slight element of doubt must remain, but since no high-nickel smelted iron of any period is known from China, it seems safe to conclude that these artefacts are indeed of meteoritic iron.

An interesting aspect is a possible connection westward, to the vicinity of Baoji, Shaanxi Province, where we shall see that other early iron swords have been found. Several sources indicate that there was a state named Guo near Baoji;⁴⁵ whether the Guo of the Sanmenxia graves was related to this Guo is less certain, but art historians believe they can see elements of nomadic culture in the décor of some of the Guo bronzes.⁴⁶

Finding meteoritic and smelted iron in the same context, seemingly wrought by the same artisans, is surprising, nearly as surprising as finding smelted iron at all at such an early date in China. More surprises are no doubt waiting for us, but it is clear that we must now look to the peripheral regions for the source of the earliest technology of iron smelting in China. Further evidence of this is afforded by a grave in Shaanxi.

⁴¹ E.g. Li Xueqin, *Dong Zhou yu Qin-dai wenming; Eastern Zhou and Qin civilizations*, 84; Guo Baojun, *Shang Zhou tong-qi qun zonghe yanjiu* (A comprehensive study of Shang and Zhou bronze vessel groups) (Beijing: Wenwu, 1981), 70; Ning Huizhen, "Shangcunling Guo guo mudi shidai chuyi (The dating of the Guo tombs at Shangcunling in Sanmenxia Municipality, Henan)," *HXKG* 2000.3, 55–57; 93. These authors argue on the basis of a single text, *Tai Kang ji* 太康記, now lost, of unknown date and authorship, quoted in *Shui jing zhu* (6th cent. A.D.), *juan* 18, Wang Guowei, ed. *Shuijing zhu jiao* (Critical edition of the "Commentary on the Classic of waterways") (Shanghai: Shanghai Renmin, 1985), 587.

⁴² E.g. Anon. 1984b, *Xin Zhongguo de kaogu faxian he yanjiu*, 283; Anon. 1992 ("Gems of China's Cultural Relics [*Zhongguo wenwu jinghua*] [Beijing: Cultural Relics Publishing House], 14, 17); Cai Yunzhang, "Lun Guo Zhong qi ren;" "Guo Wen gong mu kao."

⁴³ Han Rubin et al. "Guo guo mu chutu tie-ren tong-qi de jiangding yu yanjiu," 562.

⁴⁴ Jerzy Piskowski, "A study of the origin of the ancient high-nickel iron generally regarded as meteoritic," in Theodore A. Wertime & Stephen F. Wertime, eds., *Early Pyrotechnology: The Evolution of the First Fire-using Industries* (Washington, D.C.: Smithsonian Institution Press, 1982), 237–43; E. Photos, "The question of meteoritic versus smelted nickel-rich iron: archaeological evidence and experimental results," *WA* 20.3 (1989), 403–21.

⁴⁵ See e.g. Ru Yu, "Yu bing tie jian (An iron sword with jade hilt)." *ZYW* 1999.3, 100; inside back cover; Anon. 1999 (*Sanmenxia Guo guo mu*), 537–38.

⁴⁶ E.g. Jenny F. So in Fong, ed., *The Great Bronze Age of China: An Exhibition from the People's Republic of China* (London: Thames & Hudson, 1980), 252; note especially the mirror decorated with tigers and a horse, Lin Shoujin, *Shangcunling Guo guo mudi*, 27, fig. 21, pl. 40.2; Lin Shou-chin, "Culture of the state of Kuo," 11.

Gold-iron artefacts in a grave in Shaanxi

A grave in Baoji Municipality 寶雞市, Shaanxi, dated to the late Spring and Autumn period, contains some remarkable gold-iron artefacts, including three short-swords (Figures 11–13, 15), thirteen ring-headed knives (Figure 14), two knives with gold ring-head, “glass” (*liao* 料) back, and iron edge, and two other knives.⁴⁷ One of the short-swords has been examined by metallurgists, and was found to be of smelted rather than meteoritic iron.⁴⁸

This is a typical Chinese small grave, a rectangular shaft, measuring 1.5 x 3.2 metres at the mouth and 5.5 metres deep, with “second-level platforms” (*ercengtai* 二層臺 and with inner and outer wooden coffins (*guan* 棺 and *guo* 槨). The grave-goods, on the other hand, are highly unusual for a Chinese grave: there are no ceramic artefacts at all, there is a great deal of gold,⁴⁹ and there are many artefacts which are more typical of the steppe cultures.⁵⁰ It is difficult to date, but the date given by the excavators, corresponding to the 7th or 6th century B.C., seems secure enough.⁵¹

With iron-using cultures close by, and clear signs of cultural influence from them, it is quite possible that either the iron artefacts themselves, or the technology of their fabrication, came from outside. The ring-handled knives might in principle have been made in China or anywhere in the steppelands. The origin of this type of knife has long been a problem for archaeologists and art historians,⁵² but the best guess at the moment is that its earliest development took place in Western Siberia.⁵³ It was a simple and useful design, and spread quickly; it became one of the typical Shang bronze artefact types, and is also found throughout the steppelands. The short-swords, on the other hand, are more specifically Chinese; the décor of their hilts is unusual, but similar sword-hilts have been found in China proper, and it seems that

⁴⁷ Excavation report, Tian Renxiao, “Baoji shi Yimencun er-hao Chunqiu mu fajue jianbao (Excavation of Tomb no. 2 of the Spring and Autumn Period at Yimencun in Baoji Municipality, Shaanxi),” *WW* 1993.10, 1–14; Studies include Li Xueqin, “Yimencun jin, yu qi wenshi yanjiu (The décor of the gold and jade artefacts in Tomb no. 2 at Yimencun in Baoji Municipality, Shaanxi),” *WW* 1993.10, 15–19; Zhang Tianen, “Qin qi san lun – Yimencun Chunqiu mu jige wenti jiantan (Three notes on Qin artefacts in Tomb no. 2 at Yimencun in Baoji Municipality, Shaanxi),” *WW* 1993.10, 20–27; Chen Ping, “Shilun Baoji Yimencun er-hao mu duanjian ji youguan wenti (The short-swords from Tomb no. 2 at Yimencun in Baoji Municipality, Henan, and some related questions),” *KG* 1995.4, 361–75.

⁴⁸ Bai Chongbin, “Baoji shi Yimencun M2 chutu Chunqiu tie jian cankuai fenxi jianding baogao (Report on technical examination of a fragmentary iron sword from Tomb no. 2 at Yimencun in Baoji Municipality, Shaanxi),” *WW* 1994.9, 82–5.

⁴⁹ Gold was used very sparingly in Shang and Zhou China (e.g. Qi Dongfang “Zhongguo zaoqi jin-yin-qi yanjiu (Early Chinese gold and silver),” *HXKG* 1999.4, 68–85), but is very commonly found in Scythic contexts.

⁵⁰ Zhao Huacheng, “Baoji-shi Yimencun er-hao Chunqiu mu zushu guanjian (The ethnic identification of Tomb no. 2 at Yimencun in Baoji Municipality, Shaanxi),” *KGyWW* 1997.1, 31–34.

⁵¹ Chen Ping (“Shilun Baoji Yimencun er-hao mu duanjian”) discusses the sword and the tomb at great length and comes to roughly the same conclusion.

⁵² Important studies include Karlgrén, “Some weapons and tools of the Yin Dynasty,” *BMFEA* 17 (1945), 101–44; plates 1–40; Chen Zhenzhong “Woguo gudai de qingtong xiaodao (Ancient Chinese bronze scraper-knives),” *KGyWW* 1985.4, 72–80, 83; Li Weiming “Jianlun Shang-dai qingtong dao (A brief study of the bronze knives of the Shang period),” *ZYWW* 1988.2, 42–47; E.N. Chernykh, *Ancient Metallurgy in the USSR: The Early Metal Age* (Cambridge: Cambridge University Press, 1992), 268–70; Wu En, “Guanyu woguo peifang de qingtong duanjian (Bronze short-swords of North China),” *KG* 1978.5, 324–33; 360; Liu Yiman, “Yin-xu qingtong dao (Bronze knives from the Yin Ruins in Anyang, Henan),” *KG* 1993.2, 150–66.

⁵³ Chernykh (*Ancient Metallurgy in the USSR*, 269), who however also notes that the Russian scholar who has carried out the most detailed investigation of the problem, N. L. Chlenova, suggests the opposite: that this type of knife originated in China.

nothing like them has been found outside China.⁵⁴ While the sword-blades could have been made anywhere, the hilts were surely made by Chinese craftsmen, and it is only sensible to suppose that the blades were also made locally.

A Qin tomb in Gansu

The bronze-iron short-sword shown in Figure 16 comes from a tomb excavated in Lingtai County, Gansu Province.⁵⁵ Lingtai is only about 60 km north of the ancient capital of the state of Qin in Fengxiang County, Shaanxi, and comparison of burial styles as well as artefact styles shows clearly that this is a Qin tomb. The excavators date it to the early Spring and Autumn period, i.e. the 8th century B.C. Chen Ping argues for a slightly later date, in the reigns of Dukes De 德 and Xuan 宣 of Qin, 677–664 B.C.⁵⁶ He uses this tomb as one of the reference points in a systematic periodisation of Qin bronze vessels, and the bronzes in it seem to fit very well into his seriation.

A sample taken from the sword-blade by workers at the Beijing University of Iron and Steel Technology turned out to be totally corroded, and they felt that it was not possible to determine whether the iron was meteoritic or smelted.

The evidence presented thus far suggests that by the 9th century B.C. iron-smelting techniques developed in the West were being used by nomadic peoples of Central Asia, and that these techniques diffused to the smiths of the Chinese states by way of various non-Chinese peoples of the northwest, in what is now Xinjiang.

The Chinese smiths continued to produce luxury iron articles such as swords and knives, with fittings of gold, jade, and bronze, now using smelted iron instead of meteoritic iron. The earliest of this class of iron artefacts are found in the northwest, but by the end of the 6th century B.C. a few examples are found quite far afield.⁵⁷ Perhaps the latest example, and the one found farthest afield, is a jade-hafted dagger found in what may have been a royal tomb in the northern part of the state of Chu.⁵⁸

⁵⁴ Li Xueqin, "Yimencun jin, yu qi wenshi yanjiu," Zhang Tianen, "Qin qi san lun."

⁵⁵ Excavation report: Liu Dezhen & Zhu Jiantang, "Gansu Lingtai xian Jingjiazhuang Chunqiu mu (Tombs of the Spring and Autumn period excavated at Jingjiazhuang in Lingtai County, Gansu)," KG 1981.4, 298–301, plates 3–5.

⁵⁶ Chen Ping, "Shilun Guanzhong Qin mu qingtong rongqi de fenqi wenti (The periodisation of bronze vessels from Qin tombs of the central Shaanxi plain, parts 1–2)," KGyWW 1984.3, 60.

⁵⁷ See e.g. Tang Jigen, "Zhongguo yetieshu de qi yuan wenti," 558; Lothar von Falkenhausen, Review of Wagner 1993, *Chinese science*, 11 (1994), 104–5. Note however that several of the artefacts listed by these authors are insufficiently documented and rather uncertainly dated. Note also a gold-iron sword of the Han period discovered in a grave in Inner Mongolia (Lu Shoulin et al., "Cong Han-dai jin-bing tie-jian de jishu chuli tan chutu tieqi de baohu (The conservation of iron artefacts in the light of the technical treatment of a Han-period iron sword with gold haft)," GBY 2000.1: 86–9.

⁵⁸ Tomb M10 at Xiasi in Xichuan county, Henan 淅川縣下寺, artefact M10:33. Excavation report: Anon. 1991b (*Xichuan Xiasi Chunqiu Chu mu* [Chu tombs of the Spring–Autumn period at Xiasi, Xichuan] [Beijing: Wenwu, 1991]), 347; see also Wagner, *Iron and Steel in Ancient China*, 90–91; Jian Fu, "Ping 'Xichuan Xiasi Chunqiu Chu mu'" (Review of Anon. 1991b), KG 1994.12, 1142–146; Li Ling "Zai lun Xichuan Xiasi Chu mu – Du 'Xichuan Xiasi Chu mu'" (Review of Anon. 1991b), WW 1996.1, 47–60; von Falkenhausen, "Chu tombs at Xiasi, Xichuan, Henan province," in Yang Xiaoneng, ed., *The Golden Age of Chinese Archaeology: Celebrated Discoveries from the People's Republic of China* (London & New Haven: Yale University Press, 1999), 270–74.

Almost nothing has been published about this interesting artefact, only a brief verbal description indicating that the blade has the shape of a willow leaf, with a rounded point. The total length is 22 cm, length of the cutting edge 12 cm, width 2.2 cm. It is entirely corroded, and no metallographic examination has been attempted. The excavators date the tomb to the end of the Spring and Autumn period, i.e. the beginning of the 5th century B.C.

What part did these luxury edged weapons, of iron decorated with bronze, precious metals, and jade, play in the later development of iron technology in China? We lack the technical information needed for a careful answer to this question, but there is some reason to suggest that they may have had no great importance at all. One of the short-swords from Baoji, probably that shown in Figure 15, has a blade of pure iron, with zero carbon, rather than steel,⁵⁹ and this would not be expected to be a better metal for the purpose than bronze.⁶⁰ In Roman Europe, the historian Polybius described Gallic swords which were so soft that they bent in use, so that warriors had to fall back from battle to straighten them.⁶¹ These were undoubtedly of pure iron; metallographic examination of Celtic swords has revealed a number of examples.⁶² The Gauls used this iron because it was available, not because it was better than bronze; this cannot be the explanation for the use of iron in the luxury products we have seen here.

There is a possible exception to the pattern seen here, in which the early iron artefacts found in northwest China are all luxury wrought iron products. The tomb of a Duke of Qin, believed by many to be Duke Jing 景公, who died in 537 B.C., was excavated in Fengxiang County 鳳翔縣, Shaanxi, in the period 1978–86. In the fill of the tomb “more than ten” iron digging implements were found. In a published photograph one of these appears to be almost surely cast iron.⁶³ At the moment (April 2004) we are still dependent on journalistic accounts for all information

⁵⁹ Bai Chongbin, “Baoji shi Yimencun M2 chutu Chunqiu tie jian.” The author does not, unfortunately, give the artefact number, so we cannot be sure which sword was examined. Probably it was the one which in its present state is least presentable in a museum, and that is probably M2:3.

⁶⁰ But note that Rehder (“Iron versus bronze for edge tools and weapons: A metallurgical view,” *JOM* 44.8 [1992], 42–6) shows that work-hardening could have improved the hardness of such weapons, but that selective corrosion would probably remove any trace of this in the microstructure.

⁶¹ Polybius, *Histories*, 2.30.8, 2.33.3; trans. Pédech, *Polybe: Histoires*; Vol. 2 (Paris: Société d’Édition “Les Belles Lettres,” 1970), 73–74, 76; Paton, *Polybius: The Histories*, Vol. 1, (London: Heinemann, 1922), 317, 321, 323; cf. Walbank, *A Historical Commentary on Polybius*, Vol. 1 (Oxford: Clarendon Press, 1957), 206, 209. Plutarch, *Camillus*, 41.5; tr. Flacélère, *Plutarque: Vies*, Vol. 2 (Société d’Édition “Les Belles Lettres,” Paris, 1961), 202–203; Perrin, *Plutarch’s Lives*, Vol. 2 (London: Heinemann, 1914, repr. 1968), 201, 203. Cf. Janet Lang, “The technology of Celtic iron swords,” in B. G. Scott et al., eds., *The Crafts of the Blacksmith: Essays Presented to R. F. Tylecote* (Belfast: UISPP Comité pour la siderurgie ancienne; with the Ulster Museum, 1987), 64; R. Pleiner, “Early iron metallurgy in Europe,” in Theodore A. Wertime & James D. Muhly, eds. *The Coming of the Age of Iron* (New Haven & London: Yale University Press, 1980), 411, n. 31. Pleiner (*The Celtic Sword* [Oxford: Clarendon Press, 1993]), 157–69) introduces some much-needed nuances into the discussion of both the historical and the archaeological sources on the question of the battleworthiness of the Celtic swords.

⁶² On the microstructures of Celtic swords, see Robert Thomsen, *Et meget mærkeligt metal: En beretning fra jernets barndom* (Varde, Denmark: Varde Staalværk, 1975), 23; Pleiner “Early iron metallurgy in Europe,” 393–394; and *The Celtic Sword*; Lang, “The technology of Celtic iron swords,” R.F. Tylecote, *The Early History of Metallurgy in Europe* (London & New York: Longman, 1987); 272.

⁶³ *Guangming ribao* 光明日報 (‘Guangming Daily’), 1986.5.15: 4; reproduced in Wagner, *Iron and Steel in Ancient China*, 93, fig. 2.41.

about this tomb.⁶⁴ It is therefore not certain that the tomb really is as early as this, and more important, until a proper excavation report is published, it will not be clear whether these digging implements were found in undisturbed earth or in robber tunnels of later times. This would not be the first time that iron digging implements have been found in ancient robber tunnels.⁶⁵

If, when the excavation report is published, it turns out that this tomb is indeed as old as some believe, and if the cast-iron digging implements are contemporary with the tomb, then the discussion that follows here will require radical revision, for I shall claim that the use of *cast* iron for practical implements began in south China, in a very different cultural context from that of Qin.

4. Iron-casting and the blast furnace

The new evidence reviewed above definitely shows that wrought bloomery iron was the first smelted iron to be used in China. This has been quite a surprise, for not many years ago the available evidence was consistent with the hypothesis that China started with cast iron, only later developing the techniques of the blacksmith.⁶⁶ But while the use of wrought iron and the bloomery started in the northwest, and was a borrowed Western technique, iron casting was a Chinese invention. It seems to have started in the south.

If we restrict our view to properly published and reliably dated archaeological material the earliest cast iron artefacts have been found in south China. Perhaps the most famous is a lump of cast iron from a grave dated to the early 5th century B.C. in Luhe 六合, Jiangsu, in the territory of the ancient state of Wu. Other iron artefacts from Wu which are either uncertainly dated or not properly published may turn out to be older.⁶⁷

In the territory of the ancient state of Chu most of the evidence suggests a later date than this for the use of cast iron. The excavation of some 558 small and medium-sized graves at Yutaishan in Jiangling, Hubei 江陵雨臺山, near the site of Ying 郢, capital of Chu from 689 to 278 B.C., has provided a chronological series for many aspects of Chu material culture.⁶⁸ Here iron artefacts do not appear until the

⁶⁴ In English: Yi Xu, "Tomb of the First Emperor's ancestor," *CR* 1986.9, 58–59; plates; Su Minsheng, "Qin excavations: Human sacrifices, tomb robbers & horse pits," *CR* 1987.2, 31–33; Han Wei, "In splendor laid," *CP* 1987.5: 14–17; Anon. 1986a ("Surveys in the Qin capital," *CP* 1986.1, 14–17); Anon. 1986b ("Ancient tomb adds new clue to history," *Beijing review*, 1986.20, 6–7); *Xinhua News Agency news bulletin* (Hong Kong), 3, 5, 12, & 23 May 1986. In Chinese: *Guangming ribao* 光明日報 ("Guangming Daily"), 28 April 1986: 1; 2 May 1986: 1; 3 May 1986: 1; 4 May 1986: 1; 15 May 1986: 4; 24 May 1986: 1; 13 July 1986: 3; 6 August 1986: 1; *Renmin ribao* 人民日報 ("People's daily"), 3 May 1986: 3; 9 May 1986: 3; 25 May 1986: 3; 16 September 1986: 3. Discussion, Wang Hui, "Lun Qin Jing gong (Duke Jing of Qin)." *Shixue yuekan* 1989.3, 20–21; Wagner, *Iron and Steel in Ancient China*, 91–4.

⁶⁵ E.g. Anon. 1982 ("Jiangling Tianxingguan yi-hao Chu mu [Chu Tomb no. 1 at Tianxingguan in Jiangling, Hubei]," *KGXB* 1982.1) 73, 113.

⁶⁶ Barnard & Satô, *Metallurgical Remains of Ancient China* (Tôkyô: Nichiôsha, 1975), 67; Wagner, *Iron and Steel in Ancient China*, 145–46.

⁶⁷ Wagner, *Iron and Steel in Ancient China*, 60–85.

⁶⁸ Excavation report: Anon. 1984a; discussion: Wagner, *Iron and Steel in Ancient China*, 85–86, 152–7. Note also a later excavation of 73 more graves at Yutaishan, Chen Fengxin, "Jiangling Yutaishan Chu mu fajue jianbao (Excavation of Chu graves at Yutaishan in Jiangling, Hebei)," *JHKG* 1990.3, 1–7, plate 1.

early 4th century B.C., and this suggests an approximate date for the widespread use of iron in Chu – though not, necessarily, for its *first* use there. The actual site of the capital has not yielded iron artefacts which are definitely earlier than this.⁶⁹ There have as yet been no metallographic examinations of these artefacts, but they appear all to be of cast iron.

I have already noted a luxury iron dagger, presumably wrought, found in a royal tomb in the northern part of Chu, dated to the end of the 6th century B.C. Practical iron implements, apparently cast, which may be equally old have been found at a Chu settlement site in Jingmen 荊門, Hubei, 75 km north of Jiangling.⁷⁰

It is now difficult to maintain, as I did in my earlier book, that iron-smelting itself was independently developed in south China, but it still seems quite likely that both iron *casting* and the blast furnace originated here. And it still seems quite reasonable to connect this development with the use of bronze for agricultural implements in the state of Wu.

The written evidence shows that the population of Wu was seen in the north as 'barbarian', and archaeological evidence shows that their material culture was indeed in significant ways different from that of the north.⁷¹ They seem in particular to have had very different customs regarding the burial of the dead. The forms of their graves, together with some curious ritual animal-horns found in Wu contexts, suggest a completely different spiritual culture. On the other hand they adopted some important elements of material culture from the north, among which was bronze technology.

Bronze production was, in the Chinese states of the north, concentrated in a few very large centres. Over the centuries a narrow range of smelting and casting techniques were intensively developed, and the bronze-casting techniques developed in the Shang and Zhou foundries produced castings which are among the finest the world has known, even in modern times.

It was this highly sophisticated technology which the "barbarians" of Wu learned from their northern contacts. In a new cultural context this technology could be developed in new ways. New techniques were invented, and these techniques were applied to new uses: in particular to the production of agricultural implements.⁷²

In the Wu region copper deposits are small and scattered, and tin and lead deposits are rare; bronze agricultural implements must have been costly. As agriculture in the region developed and became dependent upon metal implements, it was necessary to find a cheaper metal. In one way or another it was discovered that iron could be cast; the problems involved in casting white cast iron could be solved, at least adequately for castings which need not be beautiful, because the

⁶⁹ Wagner, *Iron and Steel in Ancient China*, 86.

⁷⁰ Li Zhao-hua, "Jingmen shi Xianglinggang Dong Zhou yizhi yu mudi fajue jianbao (Excavation of an Eastern Zhou site and cemetery at Xianglinggang in Jingmen Municipality, Hubei)," *JHKG* 1990.4, 17–18, 22–23.

⁷¹ On the ancient states of Wu and Yue see Wagner, *Iron and Steel in Ancient China*, ch. 3. Note also Yao Fangmei, "Shang Zhou shiqi gu Yue-ren de kuangye jishu (Mining and metallurgical techniques of the ancient Yue people in the Shang and Zhou periods)," *Nanfang wenwu* (Relics from South), 1994.4: 34–37.

⁷² Wagner, *Iron and Steel in Ancient China*, 136–44.

Wu ironfounders had at their command the highly sophisticated bronze-casting techniques developed in the north.

This hypothesis is strengthened somewhat by the fact that the earliest cast-iron implements known, the implement caps found in Chu graves of the 4th century B.C. and later, have clear bronze prototypes found in the Wu region.⁷³ An obvious weakness, on the other hand, is that no early iron implements of any kind excavated in the Wu region have yet been properly published.⁷⁴ A possible answer to this objection is that Wu archaeology is still in its infancy: most finds of metal artefacts have been made by non-archaeologists, who might easily fail to recognise a badly corroded piece of iron as a valuable artefact, or even as an artefact at all.⁷⁵ Nevertheless the possibility should be held open that the development described here occurred in Chu rather than Wu: it is here that the earliest cast-iron implements are found, and a few bronze agricultural implements have also been found in Chu contexts.⁷⁶

My original suggestion was that the use in Wu of large copper-smelting furnaces led directly to the discovery of iron. In these furnaces iron ores were used as a flux to reduce the melting point of the silica gangue of the copper ore. Much more iron ore than copper ore was used, and in normal operation the iron left the furnace harmlessly in the form of iron oxide (FeO) in the slag. Improper furnace operation could lead to the production of metallic iron, and experimentation could have led in one way or another to the development of the iron blast furnace.⁷⁷

That hypothesis might still explain the development of *cast* iron, but it has always suffered from the fact that it gives no explanation for the use of *wrought* iron in Wu just as early as cast iron.⁷⁸ It now seems more likely that bloomery iron smelting was introduced in Wu from the north, and that the first iron casting involved the carburisation and melting of iron blooms in a cupola furnace of the sort used for melting bronze. Precisely this is described in a German manuscript of A.D. 1454, and it is possible that iron-casting began in Europe in this way.⁷⁹

However cast iron was discovered, for most purposes it would not have been a

⁷³ Wagner, *Iron and Steel in Ancient China*, 215–31.

⁷⁴ Two “iron artefacts” are reported very briefly from Wu graves in Wu County 吳縣, Jiangsu, which are believed to be of the Spring and Autumn period (Zou Houben, “Wuxian Wufengshan shi-shi tudun mu [Stone-chamber tumulus sites at Wufengshan in Wu County, Jiangsu],” in “Anon. 1984a,” *Zhongguo kaoguxue nianjian* 1984, 105–106), but more details will be needed before this find can be evaluated.

⁷⁵ Cf. Wagner, *Iron and Steel in Ancient China*, 83–5.

⁷⁶ E.g. Wagner, *Iron and Steel in Ancient China*, 141, fig. 3.18: 5.

⁷⁷ This begs a number of technical questions raised by Paul Craddock (Review of Wagner 1993, *Antiquity* 68.261 [1994], 887) and J. Merkel & K. Barrett, “The adventitious production of iron in the smelting of copper’ revisited: Metallographic evidence against a tempting model,” *Historical Metallurgy: Journal of the Historical Metallurgy Society*, 34.2 (2000), 59–66. The fact to be emphasised is that iron *could* be produced in a blast furnace of the same size and shape as the ancient copper-smelting furnaces, as traditional Chinese blast furnaces of the 19th and 20th centuries demonstrate (see e.g. Wagner, *The Traditional Chinese Iron Industry and its Modern Fate* (Richmond, Surrey: Curzon Press, 1997), 16–21, 58–63). The exact development route from copper to iron production would no doubt have been less straightforward than I suggested, but it would certainly have been possible.

⁷⁸ Wagner, *Iron and Steel in Ancient China*, 146.

⁷⁹ Otto Johannsen, “Eine Anleitung zum Eisenguss vom Jahre 1454,” *SE* 30.32 (1910), 1373–376; “Die Bedeutung der Bronzekupolöfen für die Geschichte des Eisengusses,” *SE* 33.26 (1913), 1061–1063.

good material. It would have been very low in silicon, and therefore be what is called *white* cast iron, which is difficult to cast and also very hard and brittle. The only advantage would have been that it was cheaper than bronze. In the north the primary applications for bronze were weapons and symbolic objects of various kinds. Substitution of white cast iron for bronze in weaponry would have had disastrous effects, and casting difficulties would have made its use unlikely in fine ritual vessels.

The blast furnace and the finery were in use in China by the 1st century B.C. If we take it that the earliest iron smelting in the south used the bloomery, and that iron casting began with the melting of iron blooms in a cupola furnace to cast agricultural implements, then the development of the blast furnace is quite easy to explain. Bloomery smelting is a delicately balanced operation, and can easily produce cast iron by mistake, as various modern experimenters have discovered. In the early West, until the advent of the iron cannon in Medieval times, no economically important use was known for cast iron, and the only intention in bloomery smelting was to produce wrought iron or steel. In some types of bloomery great skill was required to limit the carbon content of the iron produced.⁸⁰

Lumps of cast iron produced in the bloomery would however melt just as easily in the cupola furnace as iron blooms (probably more easily), so that iron smelters who were engaged in producing iron for casting would have had no reason to care about the kind of iron they produced. Experience might easily have led, as many historians believe it later did in Medieval Europe, to the high bloomery or *Stückofen*, which often produced both wrought-iron blooms and flowing cast iron in the same operation. From there the development of the much more efficient blast furnace would have been more or less straightforward. With the development of the finery for decarburising cast iron to convert it into wrought iron, the production of bloomery iron would have become uncompetitive, and in time gone out of use.⁸¹

We do not know where and when this development might have taken place, nor do we know very much about the actual furnaces used for iron smelting in China before as late as the 1st century B.C., so it would be unprofitable to speculate more here concerning details of the development of the blast furnace in China.

Studies of the origins of iron-smelting in the West stress that iron was not in the beginning a better metal than bronze. Iron seems to have been known here as early as 3000 B.C., but first became an important metal about 1200 B.C. It was originally put to use for economic reasons, an increased demand or a decreased supply of either copper or tin. In time the smiths, working intensively with the new metal, learned more about its properties and possibilities. In particular they discovered various ways of making *steel* by adding carbon into the iron. Once these discoveries had been

⁸⁰ E.g. John Percy, *Metallurgy*, Vol. 2: *Iron; steel* (London: John Murray, 1864), 326.

⁸¹ A possible scenario for the invention of the finery has been suggested by Bronson ("The transition to iron in ancient China," in Vincent C. Pigott, ed., *The Archaeometallurgy of the Asian Old World* [Philadelphia: University Museum, University of Pennsylvania, 1999]), 191). Incorrect operation of a cupola furnace for remelting iron can lead to an excessively oxidizing atmosphere, so that the molten iron in the furnace is decarburized and solidifies as a lump of wrought iron. This may have happened fairly often; the development of the finery would then start with the discovery that this unwanted by-product could be useful.

made, developed, and widely diffused, iron became the material of choice for most weapons and implements.⁸²

There is thus a certain parallel between the Western story and the story told here for China. In the 9th or 8th century B.C., in China, smelted iron may have come into use as a substitute for meteoritic iron in luxury weapons. As far as we know, there were no great improvements in the techniques of the smith until in the south, perhaps in the 6th century B.C., the founders of bronze agricultural implements discovered that they could cast iron and thus produce a useful product from a metal more readily available than bronze. How the cast-iron implements compared with bronze ones in practical use is difficult to know. The extreme hardness of white cast iron would have made it wear-resistant but also brittle. The answer to this question is however not as important as the fact that, in this application, iron was *economically* superior to bronze. Further experience with the new material, cast iron, led to great improvements in its mechanical properties. In particular the development of what we now call *malleable cast iron* made cast iron a better material than bronze and at least competitive with wrought iron or steel.⁸³

⁸² This account is largely based on Gordon Childe, *What Happened in History* (Harmondsworth: Penguin, 1964); Anthony M. Snodgrass, *The Dark Age of Greece: An Archaeological Survey of the Eleventh to the Eighth Centuries B.C.* (Edinburgh: Edinburgh University Press, 1971), and *Archaic Greece: The Age of Experiment* (London, Melbourne, & Toronto: Dent, 1980); Maddin et al., "How the iron age began," *Scientific American* 1977.10, 122–31; Marie Louise Stig Sørensen & Roger Thomas, ed., *The Bronze Age Iron Age Transition in Europe: Aspects of Continuity and Change in European Societies, c. 1200 to 500 B.C.* (Oxford: BAR, 1989); Jane C. Waldbaum, "The coming of iron in the Eastern Mediterranean," in Vincent C. Pigott, ed., *The Archaeometallurgy of the Asian Old World* (Philadelphia: University Museum, University of Pennsylvania, 1999), 27–45.

⁸³ See e.g. Wagner, *Iron and Steel in Ancient China*, 351–54.

Abbreviations

AA	= <i>Arctic Anthropology</i>
BFWW	= <i>Beifang wenwu</i> 北方文物 (Northern cultural relics)
BMFEA	= <i>Bulletin of the Museum of Far Eastern Antiquities</i>
CP	= <i>China Pictorial</i>
CR	= <i>China Reconstructs</i>
GBY	= <i>Gugong Bowuyuan yuankan</i> 故宮博物院院刊 (Palace Museum journal)
HXKG	= <i>Huaxia kaogu</i> 華夏考古 (Huaxia archaeology)
JHKG	= <i>Jiangnan kaogu</i> 江漢考古 (Jiangnan archaeology)
KG	= <i>Kaogu</i> 考古 (Archaeology)
KGXB	= <i>Kaogu xuebao</i> 考古學報 (Acta archaeologia Sinica)
KGyWW	= <i>Kaogu yu wenwu</i> 考古與文物 (Archaeology and cultural relics)
SE	= <i>Stahl und Eisen</i>
WA	= <i>World Archaeology</i>
WW	= <i>Wenwu</i> 文物 (Cultural relics)
WWTD	= <i>Wenwu tiandi</i> 文物天地 (Cultural relics world)
ZYWW	= <i>Zhongyuan wenwu</i> 中原文物 (Cultural relics from the Central Plains)

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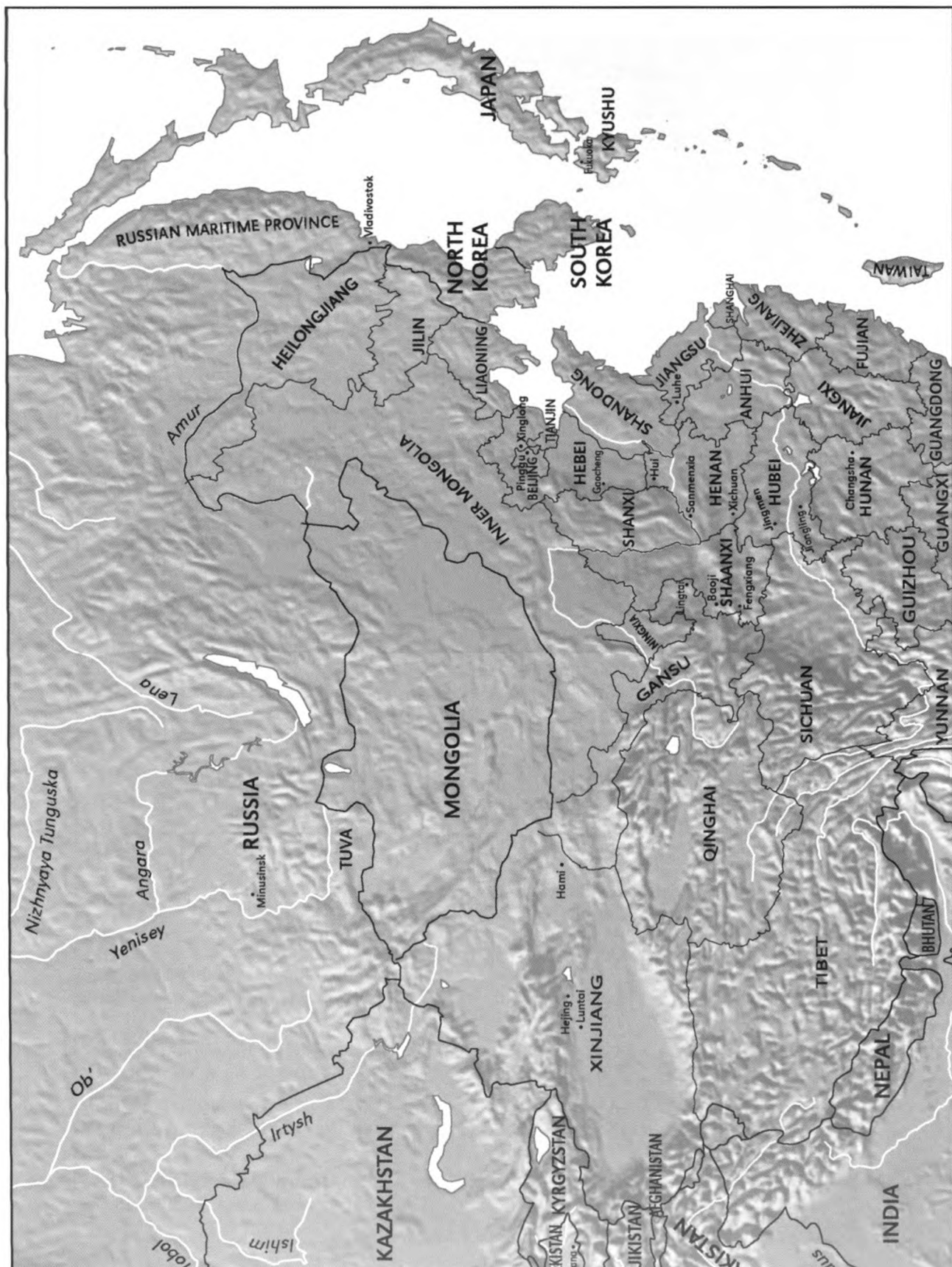
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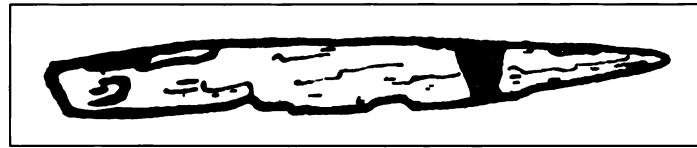
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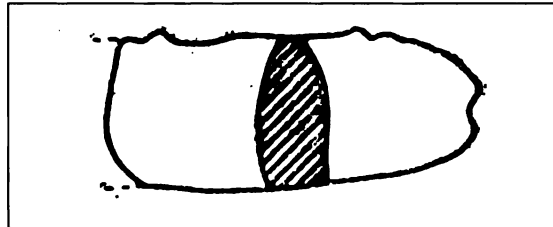
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THE EARLIEST USE OF IRON IN CHINA





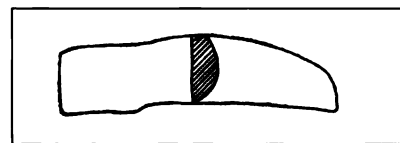
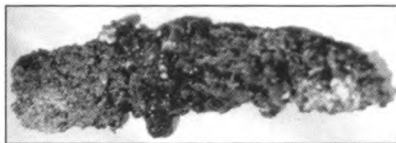
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Figure 1. Photographs and sketches of iron knives from early graves in Xinjiang.

1. From Cemetery no. 3 at Chawuhougoukou, Hejing County 和靜縣察吾乎溝口 (artefact no. M2:1). Length 16.5 cm, breadth 0.9 cm. Reproduced from Cong Dexin et al. 1990b: 887, fig. 8.3.
2. From Cemetery no. 2 at Chawuhougoukou (artefact no. M14:11). Incomplete length 5 cm, breadth 2.1 cm. Reproduced from Cong Dexin et al. 1990a:517, fig. 6.3.
3. From a cemetery at Qunbake in Luntai County 輪臺縣群巴克 (artefact no. M3D:3). Incomplete length 12.2 cm, breadth 2 cm. Reproduced from Sun Binggen & Chen Ge 1987, pl. 5.7.
4. From a period 1 grave in a cemetery at Yanbulake in Hami County 哈密縣焉不拉克 (artefact no. 31:5). Length 7.7 cm, breadth 2 cm. Reproduced from Anon. 1989a:348, fig. 26.10, pl. 13.7.

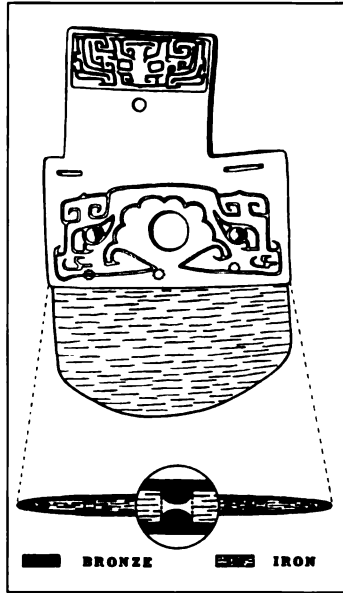


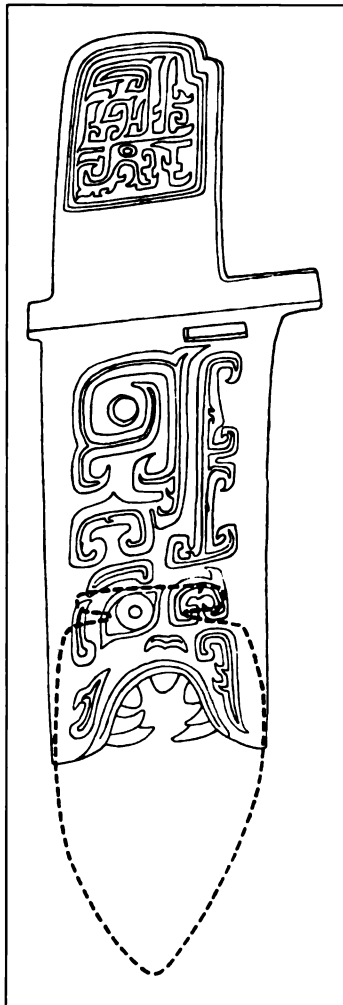
Figure 2.

Photographs and sketched reconstructions of two bronze-iron weapons of the early Zhou period, reproduced from Gettens et al. 1971, frontispiece, 12, fig. 6; 20, fig. 12.

Top: *Ge* 戈 dagger-axe head, remaining dimensions 18.3 x 7.0 cm.

Bottom: *Qi* 鉞 axehead (or *yue* 鉞 axehead), remaining dimensions 17.1 x 10.8 cm. These are believed to come from a single tomb excavated in 1931 somewhere in the vicinity of Anyang 安陽, Henan (ibid., 57ff).

Analysis indicates that the iron parts of both contain significant amounts of nickel and cobalt; they are therefore most probably meteoritic. In addition the distribution of nickel and cobalt in the microstructure of the *qi*-axehead indicates a Widmanstätten structure distorted by heating to a temperature above 600°C for a few minutes (ibid., 23ff). This strengthens the conclusion that it is meteoritic iron, and may perhaps also indicate that it was shaped by hot-working. The *ge*-axehead was too badly corroded to permit the detection of a Widmanstätten structure, and no conclusion is possible as to how it was shaped. (Reproduced by permission, Smithsonian Institution)



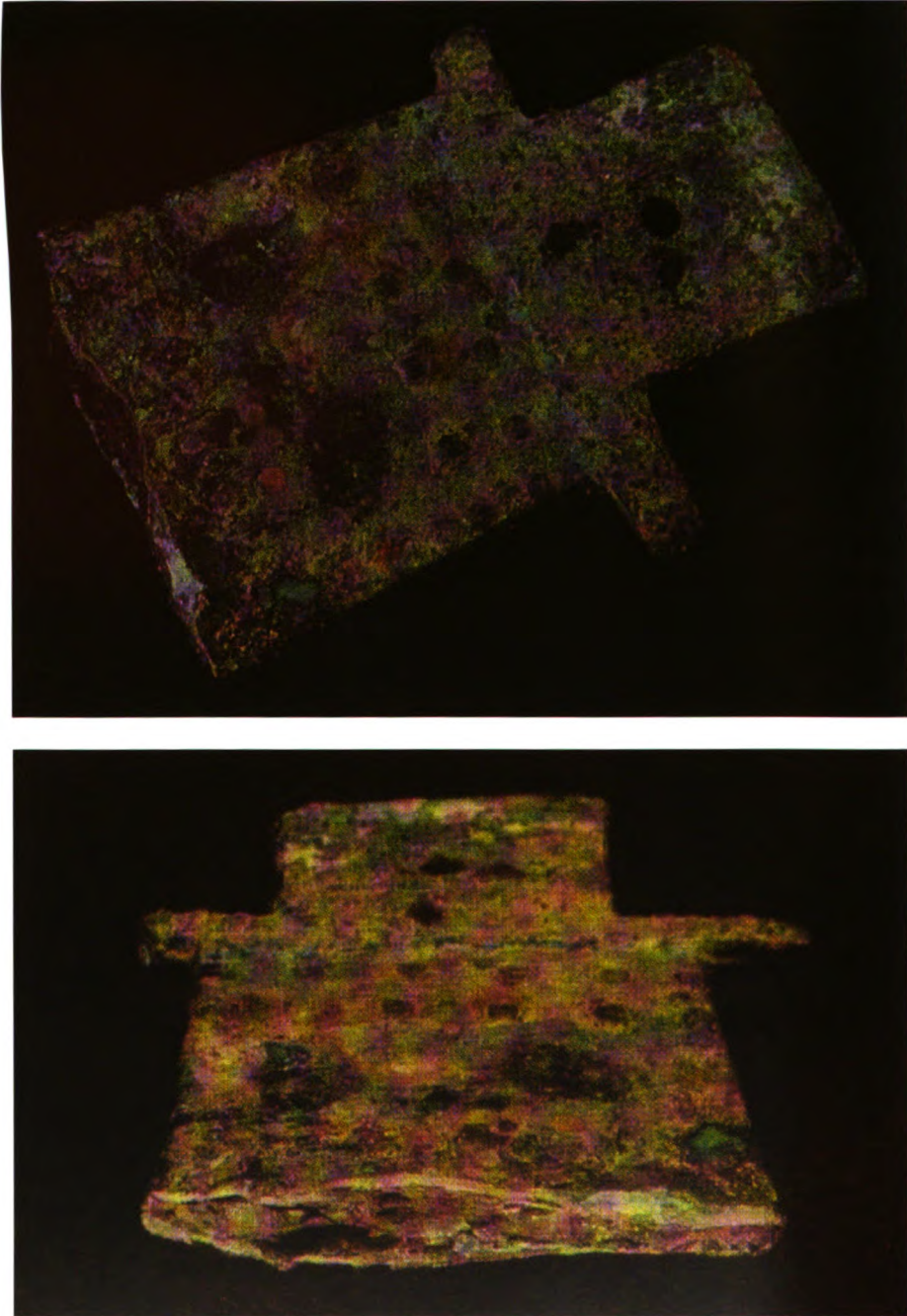


Figure 3.

Two photographs of a bronze-iron *yue* 鉞 axehead from a late Shang city-site at Taixicun in Gaocheng County, Hebei 城臺西村, reproduced from Tang Yunming & Liu Shishu 1973, pl. 1. On the site see Anon. 1977; Tang Yunming 1979; 1985. Remaining dimensions 11.1 x 8.5 cm.

Analysis shows that the iron part contains significant amounts of nickel and cobalt, and their distribution in the microstructure suggests a Widmanstätten structure which has been severely distorted by hot forging (Li Chung 1979). The iron is therefore most probably meteoritic.

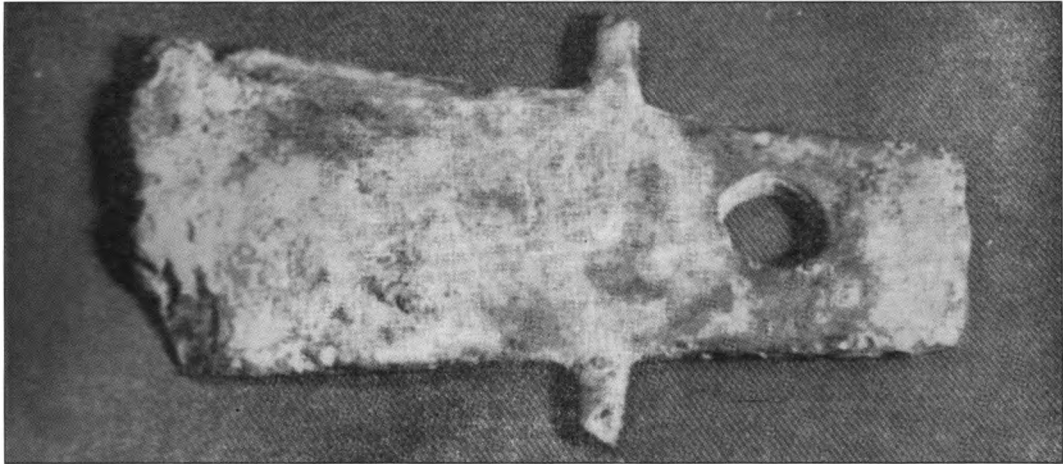


Figure 4.

Photograph of a bronze-iron yue 鉞 axehead found in a Shang-period grave excavated at Liujiahe in Pinggu County, Beijing Municipality 北京市平谷縣劉家河, reproduced from Yuan Jin-jing & Zhang Xiande, 1977, pl. 1.1; cf. Anon. 1990: 37-9. Remaining dimensions 8.4 x 5 cm. Laboratory studies indicate that the iron part contains a significant amount of nickel, and that the distribution of nickel in the microstructure is consistent with that in a Widmanstätten structure severely distorted by hot working. The iron is therefore probably meteoritic (Zhang Xiande & Zhang Xianlu, 1990).

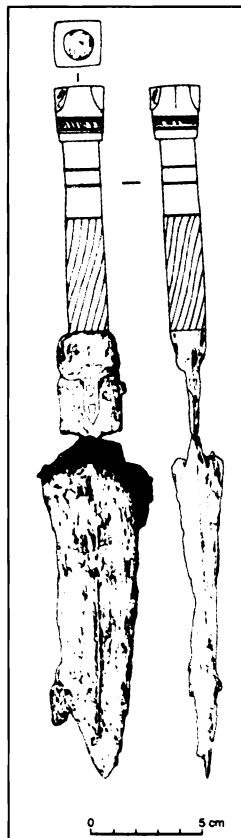


Figure 5.

Photograph and sketch of an iron short-sword with hilt of bronze, jade, and turquoise (artefact M2001: 393) from the tomb of Guo Ji 號季 in Sanmenxia, Henan, dated to the 9th or 8th century B.C. Total length 34.2 cm, blade breadth 3.8 cm.

Reproduced from Anon. 1999, vol. 1:128, fig. 105.1, vol. 2, colour plate 11.1; note also plate 44). Note also Anon. 1992, pl. 104; Ru Yu 1999.

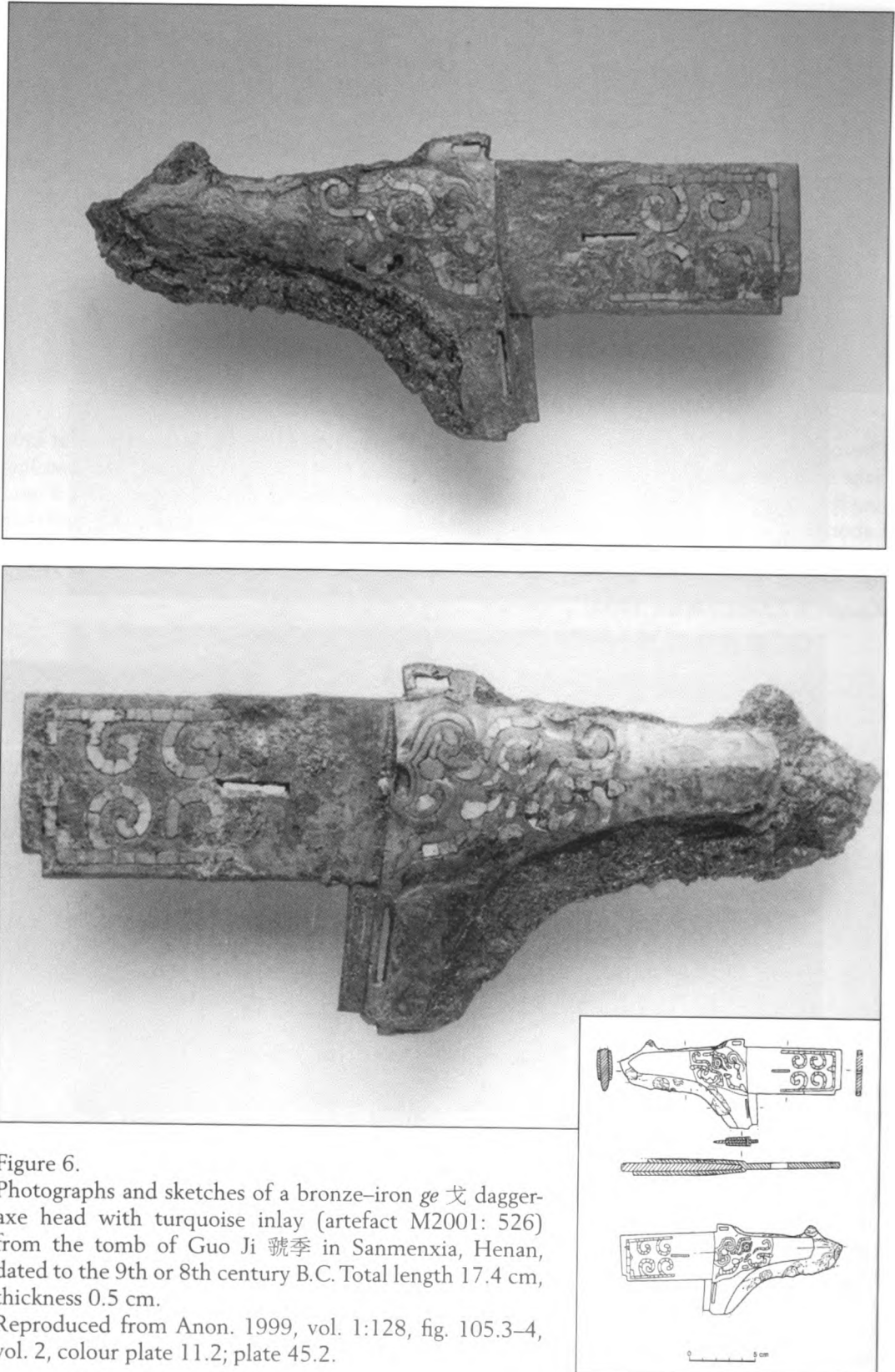


Figure 6.
Photographs and sketches of a bronze-iron *ge* 戈 dagger-axe head with turquoise inlay (artefact M2001: 526) from the tomb of Guo Ji 虢季 in Sanmenxia, Henan, dated to the 9th or 8th century B.C. Total length 17.4 cm, thickness 0.5 cm.
Reproduced from Anon. 1999, vol. 1:128, fig. 105.3–4, vol. 2, colour plate 11.2; plate 45.2.

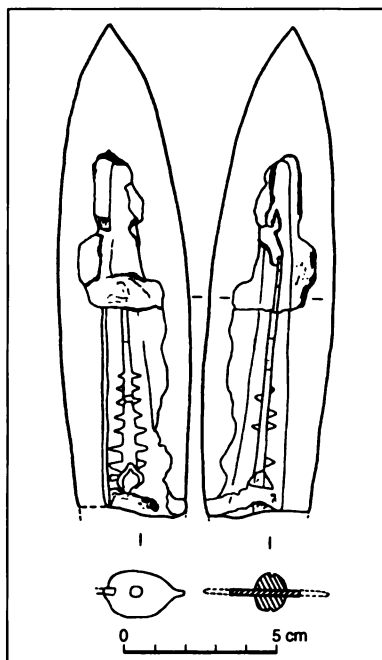


Figure 7.
Sketch of a bronze-iron spear-head (artefact no. M2009:730) from the tomb of Guo Zhong 虢仲 in Sanmenxia, Henan, dated to the 9th or 8th century B.C. Remaining length 12.7 cm, remaining breadth 2.9 cm. Reproduced from Han Rubin et al. 1999, 561, fig. 1.2.

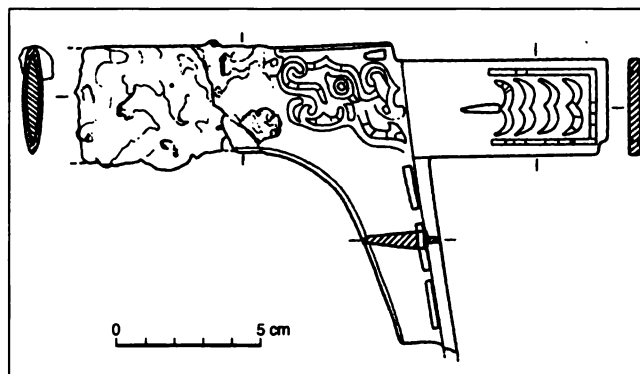
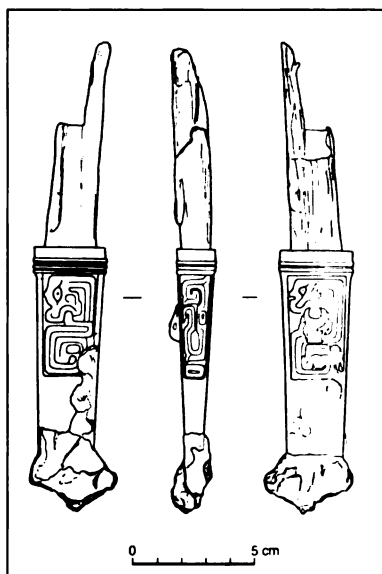


Figure 8.
Sketch of a bronze-iron *ge* 戈 dagger-axe head with turquoise inlay (artefact M2009:703) from the tomb of Guo Zhong 虢仲 in Sanmenxia, Henan, dated to the 9th or 8th century B.C. Remaining length 19 cm, thickness 0.4 cm. Reproduced from Han Rubin et al. 1999, 561, fig. 1.1.

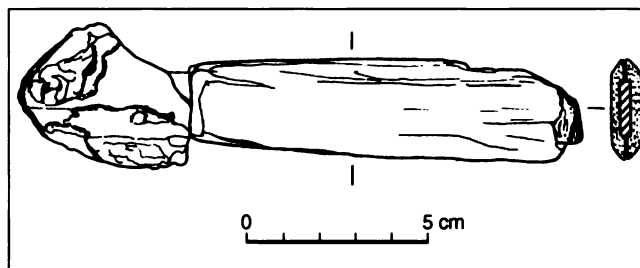


Figure 10.
Sketch of a bronze-iron scraper-blade in a wooden sheath (artefact M2009:732) from the tomb of Guo Zhong 虢仲 in Sanmenxia, Henan, dated to the 9th or 8th century B.C. Remaining length 11.2 cm, blade thickness 0.2 cm. Reproduced from Han Rubin et al. 1999, 561, fig. 1.4.

Figure 9.
Sketch of a bronze-iron adze-head with remains of a wooden insert (artefact M2009:720) from the tomb of Guo Zhong 虢仲 in Sanmenxia, Henan, dated to the 9th or 8th century B.C. Remaining length 11.3 cm. Reproduced from Han Rubin et al. 1999, 561, fig. 1.4.

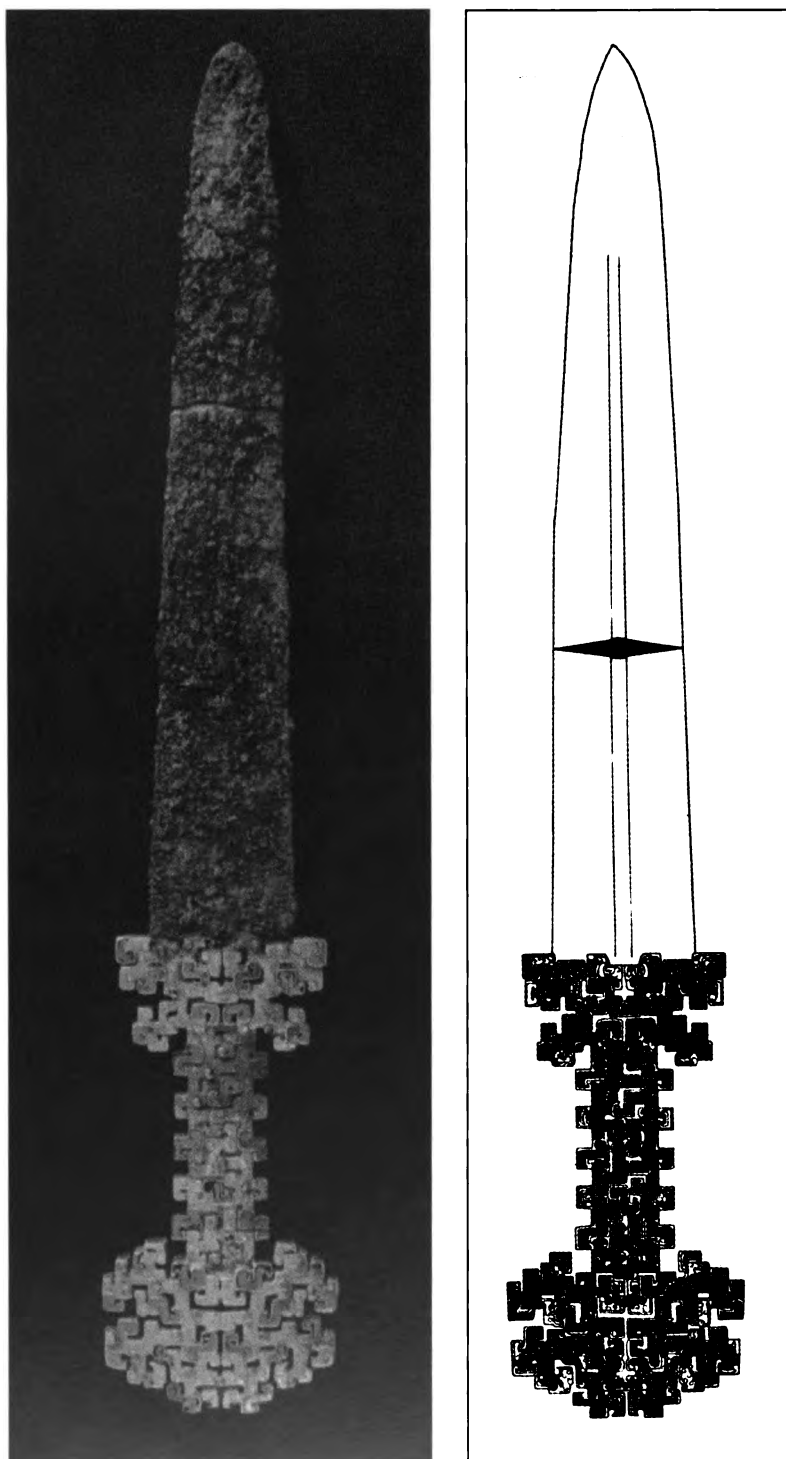


Figure 11.

Sketch and photograph of an iron short-sword with inlaid gold hilt from Grave M2 at Yimencun in Baoji Municipality, Shaanxi 寶雞市 益門村 (artefact M2:1), reproduced from Tian Renxiao 1993, 4, fig. 7.1, colour plate 1. Total length 35.2 cm, breadth of blade 4 cm.

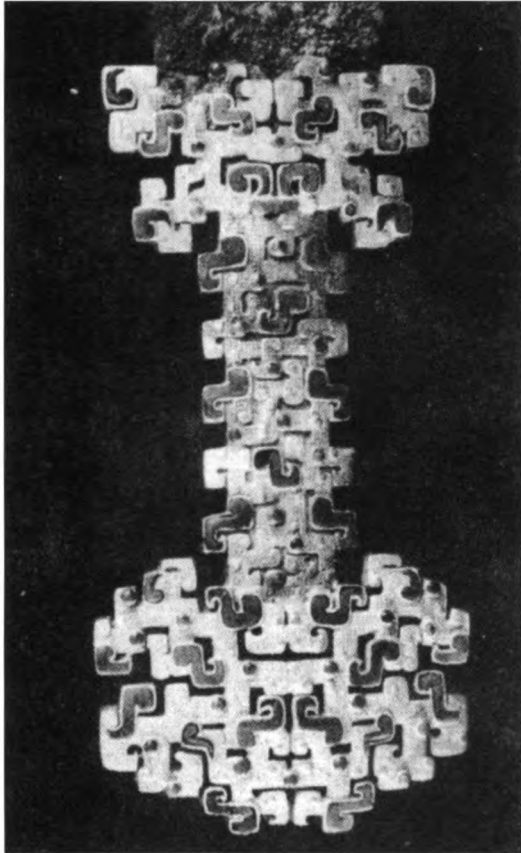
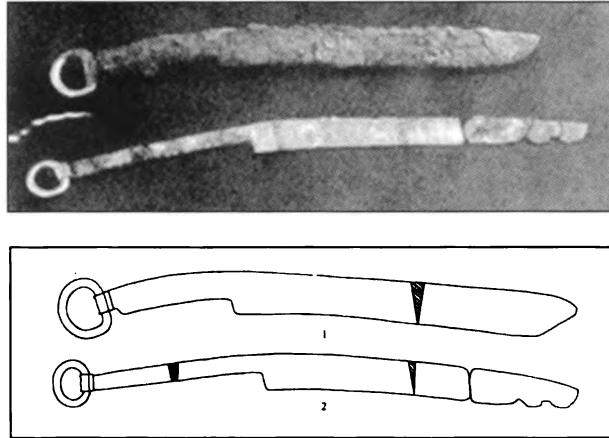


Figure 12.
Detail of Figure 11, showing the décor
of the inlaid gold hilt of the short-sword.
Reproduced from Tian Renxiao 1993, 4, fig.
7.2.



Figure 13.
Photograph of an iron short-sword with inlaid
gold hilt from Grave M2 at Yimencun in Baoji
Municipality, Shaanxi 寶雞市益門村 (artefact
no. M2:2), reproduced from Tian Renxiao
1993, colour plate 2. Fragmentary length 30.7
cm, breadth of blade 3.8 cm.



Figures 14.

Sketch and photograph of two knives with gold ring-heads from Grave M2 at Yimencun in Baoji Municipality, Shaanxi 寶雞市益門村, reproduced from Tian Renxiao 1993:6, fig. 11, plate 1.5. Upper (artefact M2:4): iron blade; total length 23.4 cm. Lower (artefact M2:18): bronze blade, fragmentary length 24 cm.

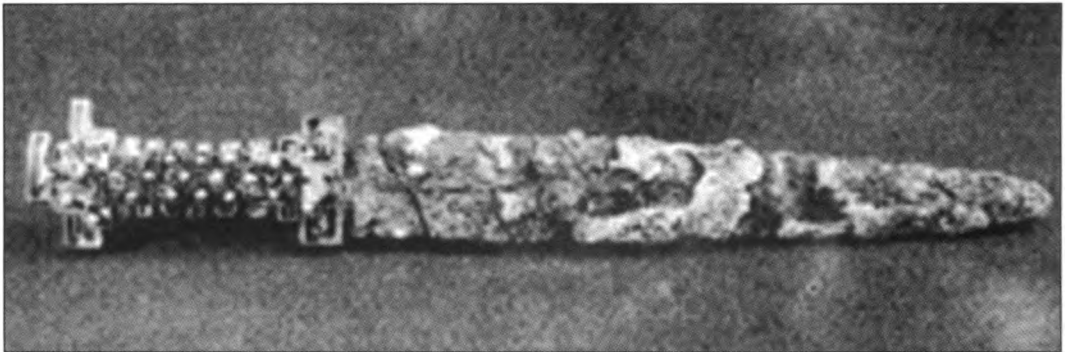


Figure 15.

Photograph of an iron short-sword with inlaid gold hilt from Grave M2 at Yimencun in Baoji Municipality, Shaanxi 寶雞市益門村 (artefact M2:3), reproduced from Tian Renxiao 1993, plate 1.6. Fragmentary length 35 cm, breadth of blade 3.7 cm.

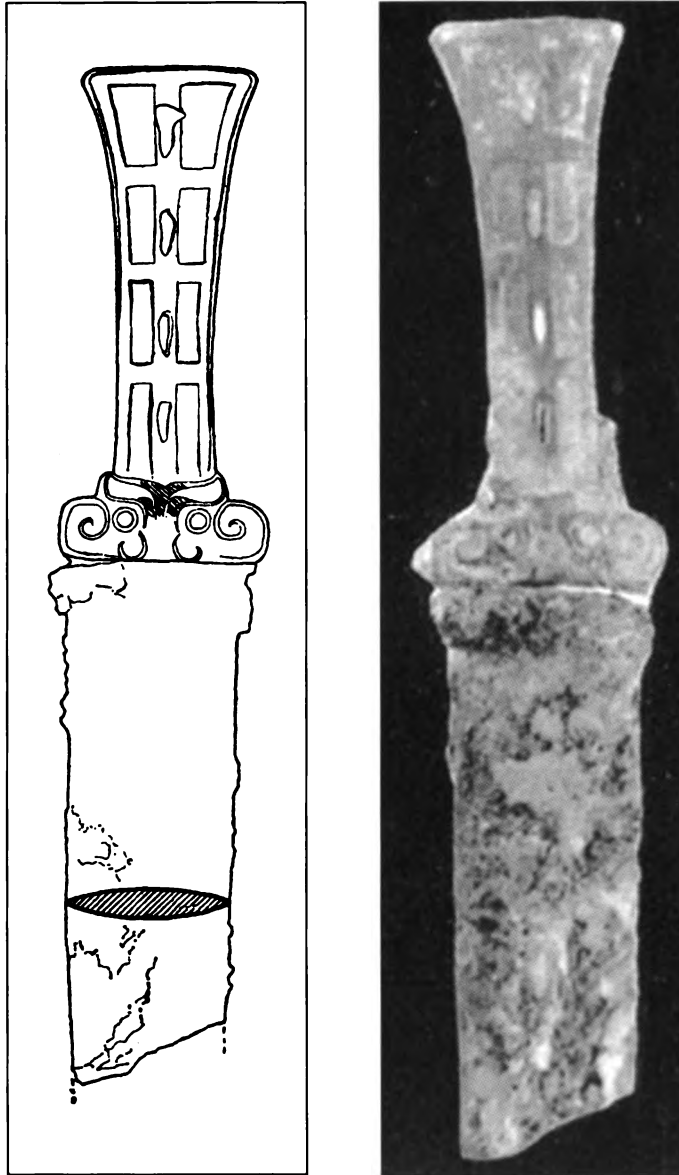


Figure 16.

Photograph and sketch of a fragment of a bronze-iron short-sword from Tomb M1 at Jingjiazhuang in Lingtai County, Gansu 靈臺縣景家莊 (artefact M1:14), reproduced from Liu Dezhen & Zhu Jiantang 1981:299, fig. 2.7, pl. 5.10. Length of bronze haft 8.5 cm, fragmentary iron blade 9 cm.

Where did the Chinese animal skin raft come from?

A forgotten issue in the study of ancient East-West cultural interactions

by

Xingcan Chen*

I. Introduction

During his archaeological surveys in Gansu Province in 1923–1924, J.G. Andersson excavated, collected and purchased thousands of ancient artifacts, including painted ceramics, and based on these materials established his theory of a six-period division of Gansu prehistory.¹ Based on these new discoveries, he further extended his initial proposals concerning the western origins of Yangshao Neolithic ceramics (which had first been discovered in 1921²): "My more recent finds in Kansu of large masses of painted ceramics of Yang Shao age, including many complete funeral urns, have only further accentuated the close relationship between the Aeneolithic ceramics of the Near and the Far East. The problem will be further discussed in the final monograph on the Kansu finds, and for the present I proceed under the assumption that in Aeneolithic time cultural influences from the Near East were strongly felt in the Huang Ho valley."³ Today, while we research Andersson's scholarly ideas, it is not easy to imagine the hardship involved in moving these materials out of Gansu to Beijing, to Shanghai, and all the way to Sweden. This entire issue in itself merits our attention, in several ways. However, this article will take up one seemingly minor aspect of this transportation as its point of departure.

According to the archival records of the Museum of Far Eastern Antiquities, as well as Andersson's popular books, he moved the objects out of Gansu chiefly relying on animal skin rafts.⁴ Indeed, it was by means of such skin rafts that these

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¹ Johan Gunnar Andersson, "Preliminary Report on Archaeological Research in Kansu." *Memoirs of the Geological Survey of China*, Series A: 5, 1925.

² Andersson, "An early Chinese culture," *Bulletin of the Geological Survey of China* 5 (1923), 1–68.

³ See Andersson, "Preliminary Report on Archaeological Research in Kansu," p. 35 of the Chinese version of the text; here quoted directly from p. 41 of the English text of the same volume.

⁴ See the photo archives of the MFEA; personal observations, 2001, 2002. Also see Fiskesjö & Chen, *China Before China: Johan Gunnar Andersson, Ding Wenjiang, and the Discovery of China's Prehistory*. Museum of Far Eastern Antiquities monograph no. 15, Stockholm: MFEA, 2004, on Andersson's custom-ordered two large river rafts, using 108 inflated yak skins, in 4 rows of twenty-seven each, for a journey Lanzhou-Baotou, on October 5–23, 1924 (Andersson's photos reproduced on pp. 90–93).

precious objects, which included whole painted ceramic vessels, were transported safely out of Gansu Province. Andersson took many photos of skin rafts, some on the Yellow River and some in the homes of local people [fig. 1]. This indicates that he was quite familiar with this particular means of transportation so common in the Chinese northwest, and that he was deeply impressed with it. However, even though Andersson was always keen on observing local popular customs in various parts of China and also made connections with such customs in his arguments concerning "early Chinese culture," he did not, as far as we have noted, at any time point to these rafts as evidence in his discussions of the possible Western origins of Yangshao culture, or the ancient cultural communications between China and the West.⁵

On the other hand, a group of Japanese scholars who visited Gansu province almost at the same time as Andersson undertook his research there in the early part of the 20th century, did put forward such an idea, directly suggesting that: "These skin-bag rafts were definitely not native to China."⁶

Chinese archaeologists for their part, in view of the scarcity of archaeological data, have almost completely ignored the issue in the period after Andersson's investigations. However, one Chinese historian, Gu Jiegang, and one anthropologist, Ling Chunsheng, each from his own perspective, have discussed these skin rafts.⁷ They did not mention the possibility of East-West exchanges, but it does seem that we can make use of their research in order to take the discussion further.

II. The nature of the skin rafts

Let us examine one by one the descriptions offered made by these different scholars, two Chinese and one Japanese source. The Japanese scholars wrote:

The construction of the skin raft is very interesting indeed. First the head and tail part are cut off along with the four limbs of one animal (cattle, pig, sheep, or the like). Then the bones and the intestines are removed, so that the inside is emptied, and the several cuts are closed using strings, thus preventing any water from entering. In essence, it is the making of a one large animal-skin air bag. When it is to be used, air is first blown into it.

Five or six of bags are tied in a row, onto a wooden rack, preventing them from separating. Five or six such bags made from pig or sheep leather can carry from one to two or up to three people. Because the bags themselves are so light, goods can be transported downstreams on such vessels, and when the job is done the vessel itself can be carried back on one man's back.

Medium size rafts are made with about twenty or thirty, or sometimes as many as a hundred and twenty bags. These kinds of rafts do not involve air-filled bags, instead they are filled with sheep wool. This type of raft is floated 2500 Chinese *li* [one *li* is equal to 0.5 km] from Lanzhou downstreams on the Yellow

⁵ Chen Xingcan 1997; Andersson 1923, 1925, 1973 (1934), 1943.

⁶ Koyukai, ed., *Shanghai To-a Dobun Shoin dai ryoko kiroku*, Beijing: Shangwu, 2000, 344.

The journey referred to here is one undertaken to Qinghai, between June 26 and November 24, 1921, by Oe Hirashi 大江廣, Kotake Fumio 小竹文夫, Kume Yukinobu 久米幸延, Shimizu Kyuzo 清水久藏, Takahashi Naosuke 高橋治助, Tomita Seizo 富田青藏, Wada Hiraiji 和田平市, and others. The full text of the observations from the journey is found on pages 295–366 of the volume.

⁷ Gu Jiegang, *Shilin zashi chubian* (Beijing: Zhonghua, 1963); Ling Chunsheng, "Study of the raft, outrigger, double, and deck canoes of ancient China, the Pacific, and the Indian Oceans," *Zhongyang yanjiuyuan Minzuxue yanjiusuo zhuankan* (Institute for Ethnology, Academia Sinica), Vol.16 (1970).

River. At the Baotou Banner they are taken ashore and then transported to the markets in Tianjin.

... the ox skin raft later came to rescue us all, by carrying the seven of us 1,200 Chinese *li* downstreams to Ningxia. When we looked at these Chinese men carrying these pig-skin rafts, made in the shape of a cotton flower bell, we could not help but feel that they seemed both skilful and funny, at the same time fantastic, and miraculous.⁸ [fig. 2].

Gu Jiegang also had personal experience of these rafts, and his description is even more detailed:

In this area there are many streams, big and small, and the water is flowing rapidly, and there are many dangerous shoals, so it is impossible to travel by boat. In view of the fact that animal husbandry is well developed, and cattle and sheep skin is over-abundant and also is a suitably light material which does not sink in water, [local people] make rafts from it, creating vessels that are very suitable for crossing the rivers.

The smallest among these rafts consist of about five animal skins, with four positioned at each corner, and one in the middle of the raft which itself is a rack built from thin pieces of wood. The larger rafts are made by connecting several smaller ones, up to ten of them, relying on from ten to a hundred ox skin bags, and with a carrying capacity of several thousand or even tens of thousands *jin* [Chinese pounds]. It is used in all of the transport that is done between the Northwest and the railroad link at Baotou ...

The required amount of air that fills such an ox skin bag is large, and not something that one person can blow into it. It is filled by means of a goat skin bag which is tied and fitted with an iron mouthpiece at one end, which is inserted into the ox skin bag. The other end is opened, using both hands, to capture air in this bag, which is then pressed into the ox leather bag. This is repeated about ten times, after which the big bag begins to fill up. This goat skin bag is called a "fire skin bag," *huo pi dai*, because it was originally an air pump used when making fire while on a journey. ...

But with this kind of animal skin raft, it is only possible to travel downstreams, not upstreams. Thus there is the saying: "Downstreams, the rafts carry people; upstreams, people carry the rafts." This refers to how the rafts are emptied of air after they have fulfilled the purpose of carrying people and goods downstreams, after which they can be carried back on foot.

In August 1938 I was in Xining yet again. There was heavy rain, and what had once been a big road was now a gully that not only could not be crossed by motorcars, but also not by donkey cart. Instead, one had to use rafts, and we returned in this way to Gaolan and then on the overflow of water to the Yellow River, a journey of more than two hundred *li* in a little over one day. This was done on a raft constructed with 23 sheep skin bags, thus it was formed from eight smaller rafts (eight rafts ought to have had 40 bags. On this raft with only 23 bags, the weight is eliminated at the connecting point between rafts, putting five bags in a row and three rows thus amounting to 15 bags; and between every four rows, one bag is inserted, this makes eight; 15 plus 8 adds up to the 23. The shape of this raft is seen in the enclosed figure) [fig. 3].

Passengers sit on top of the cargo, and cannot move about, because the waves crash into the sides of the raft; their clothes and shoes will be wet. On average one travels 20 *li* per day, about twice as fast as on a donkey.⁹

⁸ Koyukai, *Shanhai To-a Dobun Shoin dai ryoko kiroku*, 343–44.

⁹ Gu Jiegang, *Shilin zashi chubian*, 131–32. Joseph Needham says he often travelled on 13-skin goatskin rafts in use in Gansu. (Needham et al., *Science and Civilisation in China*, Vol. 4, Physics and physical technology, Part III, Civil engineering and nautics [Cambridge, England: Cambridge University Press, 1971], 387.

Ling Chunsheng travelled by means of boats made from ox leather, but they were different from the above-mentioned rafts. His description mainly seems to derive from second-hand sources:

Chinese skin boats are most famous from the Yellow River Valley. The Yellow River is more than 2500 English miles long, and the leather vessels may be used on the river between Xining and Baotou, a distance of about 700 English miles. There are two kinds of skin rafts in use on the Yellow River: Rafts carried by sheep skin bags filled with air, and ox skin boats, using ox skins filled with wool. The sheep skin rafts are composed of from twelve to fifteen sheep skin bags, and the larger rafts carrying goods may have as many as 500. As for the ox skin [boats], they are often made with 120 at a time.¹⁰ [fig. 4].

The difference between these largely similar accounts of the rafts, including their form, construction, their various points of advantage, etc., lies in the varying attention devoted to the people owning or operating the rafts. Neither Gu nor Ling paid any attention to whether the raftsmen were Han Chinese, Muslim Hui Chinese or belonged to any other minority. However, the Japanese scholars were very alert with regard to this matter: "As for the raftsmen travelling the route between Xining, Lanzhou, and Baotou, there is not one Han Chinese, all of them are Muslim."¹¹ Now, the boatmen in charge of ox skin boats may have been Hui Muslim, but since some rafts used pig skins and Muslim people would not have constructed such rafts, it seems necessary to conclude that not all raftsmen were Hui. Actually, the surmise of the Japanese observers appears to have been made to prove their hypothesis that "The skin rafts used on the upper reaches of the Yellow River probably must have come about only after contacts were established with Inner Asia and Persia, and it may be that they have been brought in by Muslims."¹²

III. Animal skin rafts in Western documents and in archaeological data

The earliest appearances of the leather raft can be traced to Herodotos' *History*, written in the fifth century BC. Let us see how he describes this kind of water transportation in Mesopotamia:

The greatest wonder of all this region, after the city itself, I will now tell you: It is the boats that travel down the river to Babylon. They are circular in shape and made of all of skins. They build them higher up, beyond Assyria, in Armenia, and they cut ribs of willow to make them. Then they stretch, over these, hides to cover them on the outside, like a kind of hull. They do not broaden the stern or narrow the prow, but leave the boat round, like a shield. They fill the whole boat with straw, load it with freight, and launch it downstream, to travel with the current. What the boats carry down mostly, are palmwood casks full of wine. They are steered by two paddles, with the two men standing upright in the boat; the one pulls his paddle towards him, the other thrusts his out.

The boats are made, some in very large size, some very small. The biggest of them are up to one hundred and twenty-five tons burden. In each boat there is a live donkey, and in the bigger boats more than one. When in their voyage they

¹⁰ Ling Chunsheng, "Study of the raft, outrigger, double, and deck canoes of ancient China, the Pacific, and the Indian Oceans," 37.

¹¹ Koyukai, *Shanhai To-a Dobun Shoin dai ryoko kiroku*, 344.

¹² Ibid.

come to Babylon and dispose of their cargo, they auction off the ribs of willow from the boats and all the straw, and they pack up the skins on their donkeys and drive off to Armenia. For it is in no way possible to travel upstream, because of the quickness of the current; that is why, also, the boats are made of skins instead of wood. When they have come back to Armenia, driving their donkeys, they make other boats again in the same way.¹³

Judging from this text in its English translation, although Herodotus offers a detailed description, it does not seem as if he actually travelled in any such vessels. Both what he says of their construction and their shape seems somewhat questionable. If we did not deduce this from the context, we would have difficulty understanding if the hay is inserted into each of the animal skin bags. Also, we cannot understand clearly from the text whether it is the case that many animal skins are sown together as one large container, or if many separate skin bags together form one large raft. This may be a problem of the English translation,¹⁴ but even so the details are not very clear, as is evident when we compare his account to those examined earlier.

However, Herodotus' account is no fabrication. In ancient Mesopotamia, in this 'land of the twin rivers,' rafts made with animal skins, or "boats" such as those mentioned by Herodotus, were in fact used from very early on. Already in the ninth and eighth century BC, Assyrians in the ancient Near East had invented animal skin rafts, and put them to frequent use in crossing rivers, as shown in ancient rock carvings. Here I mention a few examples:

1. Assyrian soldiers inflating animal skins while standing in the shadow of palm trees. Three corners of the skin bag have been tied, while the fourth is used to blow air inside. [fig. 5, James and Thorpe, 1994, 207].

2. Fully armed Assyrian soldiers riding on inflated animal skins, one hand grasping a corner of the bag, and the other used as an oar to paddle across a body of water [fig. 6; *ibid.*].

3. Two sailors on top of a raft made from animal skins and reinforced with wood both on top and underneath. The raft is carrying a full load of goods, and the raftsmen, facing the pile of goods, are using oars to steer the raft forward [fig. 7; Bertman, 2003, 253].

4. A boat with circular bottom, in which sailors are seated at each end, facing each other, and working hard to steer the boat forward. The boat is loaded with rocks, and while it is difficult to discern whether this boat itself is made from animal skins, there is a man following the boat on a skin bag, while grasping a fish in his right hand [fig. 8; Maspero, 1901, 542].

5. Two people seated at the front of an animal skin raft, vigorously making use of an oar; and one man riding an animal skin bag, holding on to the bag at one corner with his left hand, and using the right hand to latch on to the larger raft. The raft is interconnected and stabilized by means of a wooden frame, and here too the goods is interpreted as stone used as building material [fig. 9; *ibid.*].

¹³ Herodotos 1.194 (Translated by David Grene; Chicago and London: University of Chicago Press, 1987, 122).

¹⁴ Compare Herodotos, 1.194 in different translations, f.ex. by Aubrey de Selincourt (London: Penguin, 2003, 85–86).

These images come from stone carvings in different places, but the style is similar, and they are all masterpieces produced by the Assyrians. This type of animal skin raft, just as the circular-shaped skin boat (see below), was evidently and frequently used in the Greco-Roman era. As for the Arabs, they called it *kelek*, and they have used it up to the present time, and it is reported that pirates and merchants of the Persian Gulf have all used this type of craft for purposes of transportation on rivers as well as in coastal areas of the sea, for piracy as well as for commerce.¹⁵ This indicates that our rafts are not confined to ancient Mesopotamia, but have formed part of the cultural traditions of this larger region for a very long time, and have continued as such to this day.

In one instance, an unnamed Assyrian general of the 9th century BC is said to have planned to equip soldiers with inflatable animal skin bags, so that an entire army could cross a river. Some scholars have suggested that this person was the original inventor of the animal skin raft, or that he may have borrowed the idea for the practice from the Arab parts of what is now southern Iraq.¹⁶ In any case it is abundantly clear that the Assyrians, in the era before Herodotos, were already very skilled at using these rafts.

IV. Animal skin rafts in ancient Chinese historical documents and ethnographic accounts

Even though the evidence is scattered, there is actually uninterrupted mention of animal skin rafts in texts from the Han and Jin periods onwards. It is not the case, as has been suggested by Japanese scholars, that "skin bags as used for crossing rivers are not mentioned in records of the period between the Qin, Han and the Tang periods." Here below, I record some of the instances noted by Gu Jiegang, Ling Chunsheng, and Song Zhaolin.¹⁷

Hou Han shu 後漢書 (compiled by Fan Ye, 398–445 AD), in the section "Deng xun zhuan 鄧訓傳," tells us that "[in the course of a campaign, Deng] Xun then sent forth six thousand soldiers into the Huangzhong, and ordered the *zhangshi* [official] Ren Shang to lead them on. They stitched together leather to make boats by putting them on rafts [*pai*] so as to cross the rivers submerged in the water, and attacking the [enemy] braves while they still staggered around in their camp tents [?]. They captured and killed them in large numbers."

Shui jing zhu 水經注 (compiled by Li Daoyuan, d. 527 AD), "Ye yu shui pian 葉榆水篇": "The county of Buwei was formerly a part of the Ailao Kingdom of [its legendary ancestor,] Jiulong; ... In the 23rd year of the reign of Jianwu [i.e. the year 2 BC], the king sent soldiers riding on leather [*ge*; the *Hou Han shu* has *pai*, 'rack,' or 'raft.'

¹⁵ Gaston Maspero, *The Dawn of Civilization: Egypt and Chaldaea* (London: Society for promoting Christian knowledge, 1894), 615.

¹⁶ Peter James and Nick Thorpe, *Ancient Inventions* (New York: Ballantine Books, 1994), 207.

¹⁷ On some of the placenames, see further below.

Li's *Shui jing zhu* commentary says "This means that they tied together bamboo and wood as rafts that could serve as boats"; the boats then went south, downstreams, and attacked the Han Luduo 鹿蓼 [the name of a local people in Southwestern China of that era]."

Bei shi 北史 (compiled by Li Yanshou, 7th century), "Fuguo zhuan 附國傳": "In Fuguo, there is a body of water more than a hundred *zhang* wide, which flows towards the south. Here skins are used to make boats with which one can travel across."

Xin Tang shu 新唐書 (compiled by Ouyang Xiu, 1007–1072 AD), "Dongnüguo zhuan 東女國傳": "Their king lives at a stream called Kangyanchuan, where there is a weak southward current of water. There are boats made of ox skins, constructed for passing [the stream]."

Xin Tang shu 新唐書, "Xiyu, shang, Dongnü 西域上東女" states that "Their ruler is a woman, who lives at the stream called Kangyanchuan, which is dangerous and steep on all four sides, where there is a weak southward current of water. They stitch leather together for use as boats."

The *Huichen qianlu* 揮塵前錄, (compiled by Wang Mingqing, 1127–ca.1215), cites the "Feng shi Gaochang xingcheng ji [An account of the journey of the mission to Gaochang]," presented to the appointed official in charge, Wang Yande, in 981 AD (the eight year of the reign of Taiping Xingguo), in which it is mentioned that "Next, ones passes by the [abode of the] descendants of the Mao clan, living near the Yellow River, make bags (*nang* 囊) from sheep skins, inflate them with air, to make them firm, and float on the water. Sometimes they secure wooden rafts onto these bags, that are pulled across [the river]."

The *Gaochang Xingji* 高昌行記 (compiled by Wang Yanhui of the Song dynasty, 11–13th c. AD), "Next, ones passes by the [abode of] the descendants of the Nüwa [Wazi] clan, living near the Yellow River, make bags (*nang* 囊) from sheep skins, inflate them with air, to make them firm, and float on the water. Sometimes they secure wooden rafts onto these bags, that are pulled across [the river]."

The *Man shu* 蠻書 (compiled by Fan Zhuo, who flourished ca. 860–873 AD), "Tucheng diyi 途程第一:" "From the Muji Station to the Hezi Township, the distance is 70 *li*. At Lujiang, one rides in skin boats and crosses the Lu river on them."

The *Yuan shi* 元史 (compiled by Song Lian, 1310–1381 AD, et al.), "Shizu *benji* 世祖本紀:" "In winter, on the *bingwu* day of the tenth month, they crossed the Dadu [Great Ford] river crossing, and then passed through mountains and valleys, a total of two thousand *li*. When they arrived at the Jinshajiang River, they crossed it riding on leather bags and rafts."

The *Wu bei zhi* 武備志 by Mao Yuanyi (1594–1640) of the Ming era, *juan* no. 1183,

says that "The floating sack is made from cleaned sheep skins, fully inflated with air, placed under one's armpits, so that one can float on it and cross the river."

The Tibetan travelogue *Zang xing ji cheng* 藏行記程 by Du Changding (fl. in the 18th century), of the Qing era, mentions a floating bridge: "The bridge was six *chi* broad, and over 50 *zhang* long; it was made up by several tens of cattle skin sewn together all around, floated on the water supported by several tens of ropes made from bamboo."

The travelogue *Kangyou jixing* 康輶記行 by Yao Ying 姚瑩 (1785–1853), of the Qing era, also referring to China's Western border areas, mentions that: "When the summer waters rise high, the Fan 番 people [Tibetans] remove the floating bridges, and cross the rivers using skin boats."

And finally the preface to the poem "Yangbao xing 羊報行" in the collection *Taoyuan shiji*; *Luozhongji* 陶園詩集洛中集 written by Zhang Jiuyue 張九鉞 (1721–1803), of the Qing period, says that:

The *yangbao* [sheep messengers] are fast-moving water-born soldiers of the Yellow River. There is an iron wire bridge connecting the two sides of the river to the west of the city of Gaocheng. On each side, iron pillars are installed, on which carvings are made measuring the level of the waters. If the river rises one *cun* ([inch] at the pillar, [downstreams] in Zhongzhou, it will rise one *zhang* [meter]. Traditionally, the *yangbao* are used for rushing forward to deliver this warning. The way they do this is by emptying the inside of large sheep, tightly sewing the skin closed, and applying hemp oil so that water cannot permeate it. Then, brave soldiers are selected to be tied onto the back of these sheep [skins]. They are fed anti-hunger pills, and a number of water markers are attached to their waist. When they arrive at the Henan border, their speed picks up with the stream, and they travel as if flying, a thousand *li* in the blink of an eye. There will be river soldiers operating fast vessels waiting for them to arrive. They take the markers, and counting them, they will know the need to prepare and protect [the population from flooding], ahead of time. In Henan, the military garrison will meet them by boat, bringing them ashore, and loosening the ropes. If the soldier has survived, he is awarded fifty *liang* of white silver, and can eat and drink on top of that. They are sent back by boat, which takes about three months.

Since most of these are fragmented and scattered accounts,¹⁸ every skin boat mentioned may not correspond to our animal skin rafts. According to ethnographic accounts, the term "skin boat" seems to refer to at least two different kinds of craft. One is the animal skin raft which relies on the capacity of inflated animal skins to float on water, and other seems to be boats made from wooden, bamboo or skeletal materials, which are then covered with animal skins, making something more like a standard boat. In fact, this distinction has been observed by previous scholars, one of whom, Song Zhaolin, has also proceeded to identify the former as the more primitive, the other being a more evolved species of boat.¹⁹

¹⁸ More references can be found in Needham, et al., *Science and Civilisation in China*, Vol. 4, Part III, Civil engineering and nautics, 387 ff.

¹⁹ Song Zhaolin "From gourd to log canoe," in *Ershiyi shiji Zhongguo minsuxue jingdian. Wuzhi minsu juan* (Beijing: Shehui kexue wenxian, 2002), 158–75.

Song Zhaolin has gathered information on a great variety of people in China that have used or use the animal skin bag type of raft. They include, in ancient times, the Qiang 羌, the Ailao Yi 哀牢夷, the Shiwei 室韋, the Dongnüguo 東女國, the Wazi 渦子 people, and so on; in the more recent past, the Naxi 納西, the Pumi 普米, the Xifan 西番, the Mosuo 摩梭, the Qiang 羌, the Tibetans, the Mongols, and a few Han Chinese.²⁰ However, here too there is no detailed discussion of who have used inflated skins, and who have used the other type. Still, professor Song made detailed observations on Mosuo and Xifan people using these boats at the Jinshajiang River in Ninglang County, Yunnan Province, and at the Chongtian River district in Muli County, Sichuan Province.

When the Mosuo and Xifan of this area [in Yunnan] tie together sheep skin rafts, they first soak the skins so that the sheep skin will be soft. Then they inflate them with air, and at the same time bring a number of wooden poles from the forest, usually about 170 cm long, and about three or four cm. thick. They cut away the leaves and branches, and tie the poles together so that seven poles and six across together form a rectangular rack. They take it to the riverside, and tie on either four, six or eight skin bags, depending on how many people or how much goods will be carried. However, any increase in the number bags is always done in pairs. If one person or a hundred *jin* of goods is to be carried, as a standard four bags are strapped on. For two people or two donkey loads of goods, six bags are believed to be appropriate.

After the skin bags have been strapped on, a rope is tied on at each end, and the raft is flipped over, and put into the water, so that the wooden rack is on top and the bags underneath. This makes it easier to place goods on top, and protects the skin bags, which float directly in the water. When goods are carried, they must be secured on top using ropes, so they do not get blown off by the wind. When people ride on the raft, they should lie down halfway and hold on to the rack, keeping steady, for if not, the raft is easily overturned.

On the smallest rafts, no oar is used, but instead the raft is usually pulled from shore to shore using ropes that are tied onto it and which are pulled by raftsmen standing on either side of the river. When the raft is heading east, the raftsmen on the eastern side pulls in the rope, and the raftsmen on the western side lets it out; going in the other direction, the man on the western side pulls in the rope, and the raftsmen on the eastern side lets it out. In this way they cross and come back, repeating the roundtrip journey.²¹ [Figs. 10; 11].

Even though we cannot confirm the precise identity of every skin boat mentioned in the older records cited in the above, whether or not they were all inflated skin-bag boats or rafts, we can clearly conclude that most examples derive from deep river valleys in China's Western and Southwestern areas. Even the observations on those boats that are made from wood or bamboo and then covered in skin on the outside, or, "leather sewn together to make boats," also derive from these regions. Gu Jiegang's research showed that "Buwei" County is present-day Baoan of Yunnan Province; "Fuguo" was located in between present-day Sichuan and Qinghai; "Dongnüguo" was in the Chamdo area of present-day Tibet.²² All other localities are either along the upper reaches of the Yellow River, or on the upper reaches of the Yangtze River and on the Yunnan-Guizhou plateau. These are all areas where transportation is

²⁰ Song Zhaolin "From gourd to log canoe," 169.

²¹ Song Zhaolin "From gourd to log canoe," 169–70.

²² Gu Jiegang, *Shilin zashi chubian*, 133.

difficult, and the rivers descend very rapidly. Thus the development of the animal skin bag raft and skin boats used to cross the rivers may be seen as local people's adaptation to their environment.²³

V. Why the rafts were used

Culture is a product of peoples' adjustment to their environment, and the skin rafts have to be seen in this light. With regard to this issue, the scholars of both ancient times and more recent times have already provided answers for us. Herodotus for his part believed that it was because of the "rapid flow of the water, which made it impossible to travel upstreams," the local people of Mesopotamia used skin rafts instead of wooden boats. The skin rafts could be folded up and carried on the back of donkeys, back to the Armenian grasslands in the North. This was a direct reason. There was also the indirect reason that Mesopotamia had been cultivated for a long time, the forests that once existed had been cut down, and the area was surrounded by deserts. There was little raw material for either wooden boats, or fuel, which is why there was the possibility of "auction[ing] off the ribs of willow from the boats and all the straw," as mentioned by Herodotus. On the Armenian grasslands, there would have been a good supply of horses, cattle, sheep, donkeys and other big herbivores, which in themselves provided the necessary raw materials for the rafts.

As mentioned, Gu Jiegang observed that the areas where the rafts were in frequent use had rivers that were difficult to navigate using regular boats, and since husbandry was so well developed, there was an ample surplus of the skins of cattle and sheep, e.g. important raw materials for the local raft-making. His views were quite similar to those of Herodotus. Also, like in the observations made by Japanese scholars, Gu stressed how light and easy to transport they were, giving rise to the saying, "Downstreams, the rafts carry people; upstreams, people carry the rafts."

To sum up, the following are the general conditions of the skin rafts:

1. Prevalent in high-altitude country criss-crossed by rivers with rapid current. Land transportation is difficult, as is transport by wooden boats;
2. There is an abundance of sheep and cattle, and thus there is a secure source of good raw materials;
3. Animal skins are light, and float on water when inflated; and they can be carried easily when taken out of the water, emptied and folded up.
4. There is a lack of wood or other suitable boat-making materials, so it is not easy to make other kinds of boats.

These are the reasons why so many different regions of the world have seen the rise of these vessels. We know of South American examples, such as the Tarapaca native Indians of Chile, as well as people in other desert coastal areas, who have

²³ Indeed, one early study of the world distribution of these rafts came to the conclusion that they originated at the upper reaches of the fast-flowing great Central Asian rivers (i.e. S. Lagercrantz, "Inflated skins and their distribution," *Ethnos* [Stockholm], 1944, 2, 49, cited in Needham et al., *Science and Civilisation in China*, Vol. 4, Part III, Civil engineering and nautics, 387).

used sea lion skins to make fishing boats. The natives of the Ica River valley, as well as the Arica Indians, used the same type of boats for fishing, and, according to Ling Chunsheng, also proceeded to travel far out into the Pacific. The Maipo and other Indians of central Chile already in the 18th century travelled with passengers to distant places in their two-oar rafts made from seal skin bags, into which the air was blown through a single small hole.²⁴ In South Asia, as well as in Japan, skin bag rafts have also been used quite recently.²⁵ And as mentioned already, both pirates and merchants of the Persian Gulf area have used them, too, but to use them in open sea is very dangerous and not usually done by ordinary people.²⁶

As for boats built by affixing animal skins on a frame of wood, bamboo, or bone, real boats made in skin but where the boatsman sits inside as opposed to floating on top of skin bags, the distribution has been even wider. As far as we know, such a round boat (sometimes known as in English as a coracle, or a curragh²⁷) is still used in what was once Mesopotamia, known in Arabic as *quffa* or *kufa*, also meaning basket; in ancient times they were also known as *lobu* [Fig. 12].²⁸ Such simple boats have also been used by ancient Britons and in recent times among Irish, Welsh, and Missouri Indian people [Fig. 13],²⁹ as well as among local people in the borderlands between Tibet and Sichuan Province in China [Fig. 14],³⁰ as well as in Manchuria.³¹ Furthermore, the variety of this type of boat that uses bones of large marine mammals for a frame is very highly developed in the northern polar region, under the name of *kayak* or *umiak*.³²

Whether or not they represent a logical progress as compared with inflated rafts, is hard to say. The former, the rafts, are floating devices made from whole animal skins, which are filled either with air, or with wool or hay; the latter, as mentioned, are frame constructions covered with skins, and with the passengers sitting inside, i.e. boats. Interestingly, they often co-exist. This is the case in China, as well as in Mesopotamia, and environmental factors are probably still crucial, not least since both kinds are light vessels that are easy to handle.

²⁴ Ling Chunsheng, "Study of the raft, outrigger, double, and deck canoes of ancient China, the Pacific, and the Indian Oceans," 33.

²⁵ Nishimura Shinji, *Wenhua yidong lun* [A theory on the migration of cultures]. Chinese translation; Shanghai: Shangwu, 1936, 156; on skin-float rafts in Japan see Nishimura Shinji, *A Study of Ancient Ships of Japan*, part 1, 3 (Tokyo: Waseda University, 1917–30; cited in Needham et al., *Science and Civilisation in China*, Vol. 4, Part III, Civil engineering and nautics, 387).

²⁶ Maspero, *The Dawn of Civilization*, 615–16.

²⁷ Needham et al., *Science and Civilisation in China*, Vol. 4, Part III, Civil engineering and nautics, 386; also James Hornell, *Water Transport: Origins & Early Evolution* (Cambridge, England: Cambridge University Press, 1946).

²⁸ Stephen Bertman, *Handbook to Life In Ancient Mesopotamia* (New York: Facts on File, 2003), 252; Maspero, *The Dawn of Civilization*, 615.

²⁹ Gordon Cortis Baldwin, *Strange Peoples and Stranger Customs* (New York: Norton, 1967), 155–56; Robert H. Lowie, *Indians of the Plains* (New York, American Museum of Natural History/McGraw-Hill, 1963), 48–49; see also Hornell, *Water Transport: Origins & Early Evolution*, for more examples.

³⁰ Ling Chunsheng, "Study of the raft, outrigger, double, and deck canoes of ancient China, the Pacific, and the Indian Oceans," 37; Needham et al., *Science and Civilisation in China*, Vol. 4, Part III, Civil engineering and nautics, 386.

³¹ Needham, op. cit., 386. Needham also cites a passage from the *Zhuangzi*, which describes a man who picks up and walks away with his boat, thus probably a "coracle."

³² Baldwin, *Strange Peoples and Stranger Customs*, 155–56.

VI. Where did the animal skin rafts of the upper reaches of the Yellow River come from?

The Japanese scholars we have cited surmised that the animal skin rafts seen on the Yellow River's upper reaches had been brought in from Central Asia. One reason for this was that in ancient China, gourd vessels were used, in much the same way that the skin bags are used for the rafts.³³ On the other hand, there is in China, without doubt, a very ancient tradition of using gourds to cross rivers.³⁴ However, these may also have coexisted – which seems logical, once we accept the idea of these crafts as manifestations of the adaptation to specific environments.

Considering the issue in this way, the answer to the question regarding where the animal skin rafts of the upper part of the Yellow River came from becomes almost self-evident. The issue becomes not whether a central Asian leather bag or the Mesopotamian *kelek* came to China by way of diffusion, but the striking resemblances between the two. First of all, they both used ox, cattle or sheep skins to make their rafts; second, the method of manufacture was very similar, sometimes tying up three legs and using the fourth for inflating, or filling the skin with wool or hay; third, the method of use were also very similar, either letting one single person ride on top of a bag, or making a frame, held afloat by the inflated animal skin bags, whether filled with air, or with hay or wool, creating a larger space; fourth, the function is similar, carrying passengers or cargo; fifth, at the end of the journey the raft is carried back either by people, or pack animals. If we look at these traits in isolation, it would seem that the Chinese example might be derived directly from the ancient Mesopotamian *kelek*. But there does not seem to exist any ethnographic or archaeological data that can fill the rather wide gap between ancient Mesopotamia's region and the recent history of China's Northwest. As long as such evidence does not emerge, we had better regard the emergence of these rafts as the adaptation to the natural environment.³⁵

At the same time, it is interesting that ancient and modern scholars alike have almost always taken these rafts to be non-Chinese in origin. Song Zhaolin said directly that they represent "a great invention made by the minorities."³⁶ The great Qing period scholar Zhao Yi 趙翼 (1727–1814), in his major work *Gaiyu congkao* 陔餘叢考, *juan* 23, says that "The use of leather [*ge*] as a boat, to cross the river at night, is by means of ox skins, from which the boat is made. Its history is long, and it derives from the customs of the Fan [Tibetans]." He also believed it was first created by minority nationalities. Although there is no value judgment involved here, it is also not regarded as any particularly outstanding invention. Song Zhaolin maintained that it was, but overlooked the need to discuss even the possibility of an external origin, and in fact adopts the position of the majority of anthropologists comparing cultural differences.

In this respect the fate of the raft in the scholarly world resembles that of the

³³ Koyukai, ed., *Shanghai To-a Dobun Shoin dai ryoko kiroku*, 344.

³⁴ Ling Chunsheng, "Study of the raft, outrigger, double, and deck canoes of ancient China, the Pacific, and the Indian Oceans," 26–30.

³⁵ See Chen Xingcan, *Kaogu suibi* [Essays in archaeology] (Beijing: Wenwu, 2002), 10–17; 119–125.

³⁶ Song Zhaolin "From gourd to log canoe," 169.

round skin boat. When early European explorers came to America and saw this kind of boat among the Indians at the Missouri river, they immediately decided it had to have been derived from the Welsh.³⁷ However, as the foremost of North American anthropologists of the first half of the twentieth century, Robert Lowie said, "This invention is so simple, and it is spread so spottily; it may well be that it was invented separately in many different places and on different occasions."³⁸ This is also how we ought to approach the problem of the invention of the animal skin raft.

The Japanese scholars who suggested that the upper Yellow River rafts must have been brought in from the West, clearly do not seem to have been aware that evidence was lacking for their hypothesis. They also suggested that "This way of crossing rivers seems to have been widely used across ancient Asia, in many countries and among various peoples."³⁹ If this was the case, this invention could naturally also have been made in China. Obviously, because China in the early twentieth century was such a weak and poor country, no such discovery, no matter whether important or not, could not have had anything to do with the Chinese. Painted ceramics need not be mentioned; bronzes, wheat, war chariots, writing, cattle, sheep, horses, chicken, water buffalo, hill rice and irrigated rice, kaoliang, etc; even though all these are items closely related with Chinese civilization, simply must have come from either the Near East, or from India.⁴⁰ The suggestions made by the Japanese scholars in this particular case did not rely on evidence, but instead fit with the general political and academic climate.

We do not know what Andersson thought of the origins of the skin rafts. Perhaps he was unaware of the early presence of such rafts in ancient Mesopotamia; perhaps he did not think it was an extraordinary tool, or that it at the very least was something that people across every part of the ancient world might have invented on their own. At the very least, we note the interesting fact that he never pointed to the animal skin rafts as another indication of a Western origin for Yangshao culture.

³⁷ Baldwin, *Strange Peoples and Stranger Customs*, 156.

³⁸ Lowie, *Indians of the Plains*, 49.

³⁹ Koyukai, ed., *Shanghai To-a Dobun Shoin dai ryoko kiroku*, 344.

⁴⁰ See f.ex. C.W. Bishop, "Beginnings of civilization in Eastern Asia," in *Annual Report for the Smithsonian Institution for 1939* (Washington, DC); for discussions see Xia Nai, *Zhongguo wenming de qiyuan* [The origins of Chinese civilization] (Beijing: Wenwu, 1985), Chen Xingcan, *Zhongguo shiqian kaoguxue shi yanjiu 1895-1949* [Studies in the history of Chinese prehistoric archaeology, 1895-1949] (Beijing: Sanlian, 1997).

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Fig. 1.
Animal skin raft made by
local people at the Yellow
River in Gansu. Photo by
J. G. Andersson.



Fig. 2.
A raftsmen carrying
his raft. After Ling
Chunsheng.

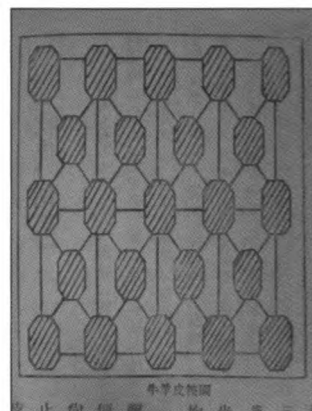


Fig. 3.
The structure of an
ox-skin raft. After Gu
Jiegang, 1963.

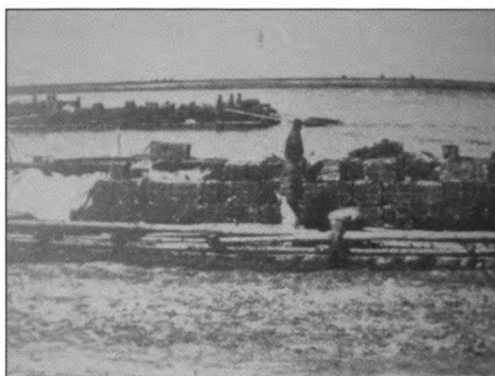


Fig. 4.
Large raft. After Ling Chunsheng, 1970.

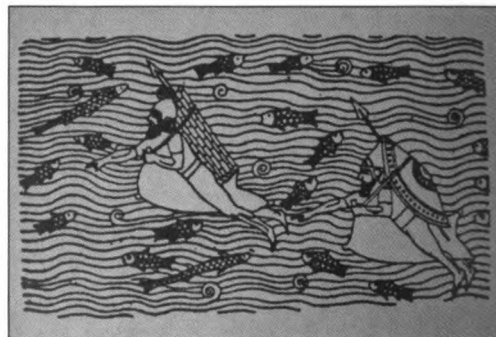


Fig. 6.
Armed Assyrian soldiers riding on
inflated animal skins. After James and
Thorpe, 1994, 207.

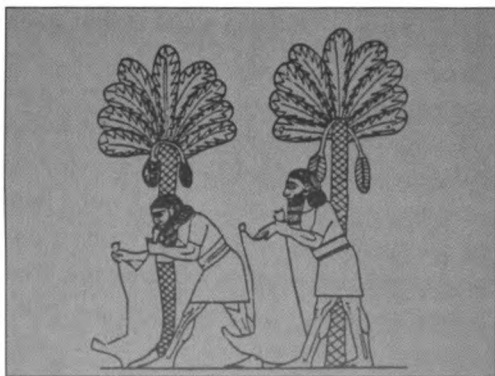


Fig. 5.
Assyrian soldiers inflating animal skins.
After James and Thorpe, 1994, 207.

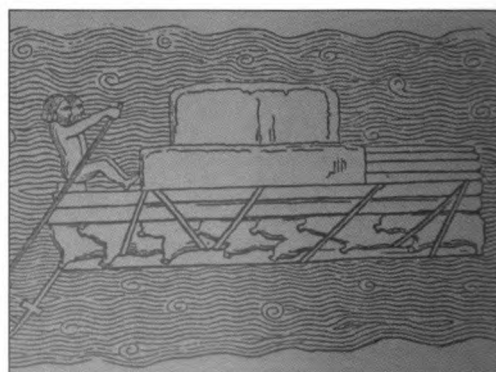


Fig. 7.
Ancient animal skin raft reinforced with
wood. After Bertman, 2003, 253.

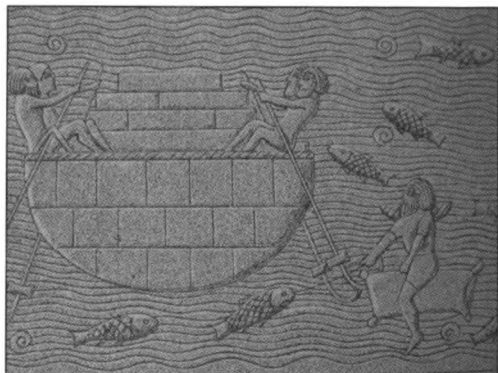


Fig. 8.
Circular boat with man following on a
skin bag. After Maspero, 1901, 542.



Fig. 9.
Man following a larger boat on an animal
skin bag. After Maspero, 1901, 542.



Fig. 10.
Pumi skin raft.
After Song Zhaolin, 2002, 169–70.



Fig. 11.
Mosuo skin raft.
After Song Zhaolin, 2002, 169–70.



Fig. 12.
An arabian qufa.
After Maspero, 1901.



Fig. 13.
Skin boat in use on the Missouri River.
After Lowie, 1963.



Fig. 14.
Ox skin boat in the Sichuan-Tibet border areas.
After Ling Chunsheng, 1970. The famous
ethnographer himself is second from left.

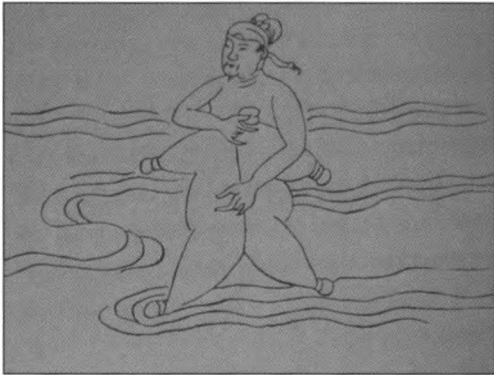


Fig. 15 a-e.
Animal skin rafts from China's North-
western and Southwestern regions.
After Ling Chunsheng, 1970.



Some Problems Concerning Korean Dolmens in Eurasian Perspective

by

Choe Chong-pil

I. Introduction

The problems concerning the origin of dolmens and their relation to the emergence of complex societies in Korea have long interested archaeologists and historians. However, attempts to explain the origin and the diffusion routes of the Korean dolmens have remained less than convincing.

Several hypotheses concerning the origins of the Korean dolmens have been suggested in the past. Among them, the most striking one is one that suggests that dolmens started to appear in the central Europe and then spread through the Mediterranean area to India and Southeast Asia, along coastal lines, and from there they reached the Korean peninsula.¹ This hypothesis, however, does not specify the detailed process of diffusion along this route, from Europe to the Korean peninsula. It also clearly was based on certain assumptions regarding cultural diffusionism and thus is closely related to Anderssons' and other scholars' speculations regarding the possibility that ancient Chinese civilization was diffused from Europe.²

Modern anthropological research provides new perspectives and frameworks for approaching the origin of Korean dolmens in relation to the emergence of complex societies in Korea. Still, the available archaeological data before 1990 was insufficient to identify all of the problems associated with the Korean dolmens. However, since 1990, due to rapid industrialization and urbanization in Korea, a great number of excavations have been carried out, thus yielding a variety of artifacts and archaeological sites that require a new interpretation.

Following on these discoveries, several scholars have suggested that the Korean dolmens were developed indigenously, and, furthermore, that the major mechanism

¹ Glyn E. Daniel, *The Megalithic Builders of Western Europe* (London: Hutchinson, 1963), 142; Kim, Jae-won and Yoon, Mu-byong, *Hankook jisokmyo yonkoo* [Korean dolmens]. (Seoul: National Museum of Korea, 1967), 14; Kim, Byong-mo, "On the Origins of Korean Megaliths," *Hankook koko hakbo* [Journal of Korean Archaeology] 10, 11 (1981), 55-78.

² J.G. Andersson, "Researches into the Prehistory of the Chinese," *Bulletin of Museum of Far Eastern Antiquities* 15 (1943), 7-304.

causing the early complex Korean societies was the construction of dolmens in Korea.³

It has now been revealed that dolmens were the foremost burial structure during the Korean Bronze age. Traditionally, the dolmens had already been understood as one of the two main burial types of the Korean Bronze Age, alongside the stone cist.⁴ But it was now clarified that the dolmens continued to be constructed as main burial types in southwestern Korea until the Early Iron Age, after which they were replaced by new burial types such as wooden coffin burials, jar coffin burials, and stone-lined burials in regions of Korea.

II. Geographic distribution of dolmens in Asia

The distribution of dolmens in Asia indicate a very interesting picture, defining cultural areas. The geographic distribution of dolmens ranges from the eastern areas of the Black Sea, India and the islands of Southeast Asia to Manchuria and Korea, but in Northeast Asia, dolmens are mainly found on the Korean peninsula.

If we carefully examine the geographic distribution of dolmens in East Asia, we see that it ranges from east of the Liao River, including the Liaodong peninsula, into the Jilin areas of northern Manchuria, and onto the Korean peninsula and across to the Kyushu Island of Japan, in the far southeast.⁵ With the exception of Japan, excavations at dolmens in these areas produced artifacts similar to those seen from the Korea Bronze Age elsewhere, such as the guitar-shaped bronze dagger, the semi-lunar stone knives and the typical Korean Munmun Pottery.⁶ If one looks at geographical distribution of dolmens in East Asia, it is striking that research in Inner Mongolia and the Russian Far East have not yielded any dolmens. It is also very interesting that while four dolmens have been found on the Shandong Peninsula across from Korea and about fifty have been located in the Zhejiang province in southeastern China, none have been found in central and northeastern China west of the Liao River. This suggests that the Liao River clearly is the boundary dividing cultural areas of Bronze Age culture in East Asia, setting apart those that were based on dolmen construction. Recent archaeological research has demonstrated that there are about 30,000 dolmens identified in the Korean peninsula.⁷ Among them, about 20,000 have been reported from the southwestern part of Korea which is regarded as one of the early birthplaces of ancient complex societies in Korea.

The natural environment of dolmens sites is nearly always regularly patterned, throughout northeast Asia. Dolmens are often situated on the tops of hills, or on

³ Choe, Chong-pil, "Chieftdoms and Korean Ancient History," *Sonsa wa kodae* [Journal of Prehistory and Ancient History] 8 (1997), 81-104; Choi, Mong-lyong, "Origins and Diffusion of Korean Dolmens," *Hankook sanggo sahakbo* [Journal of Korean Ancient History] 30 (1999), 2-20.

⁴ Kim, Won-yong, *Hankook kokohak kaesol* [Introduction to Korean Archaeology] (Seoul: Il Chi Sa Co. 1986).

⁵ Kim, Jung-bae, "Dolmens in Liaoning Peninsula and Korea," *Sonsa wa kodae* [Journal of Prehistory and Ancient History] 7 (1996), 77-92.

⁶ Ha, Mun-sik, "The distribution and Structure of Dolmens in Northeastern China," *Ko Mun Hwa* [Ancient Culture] 50 (1998), 42-46; Choi, Mong-lyong, *Hankook jisokmyo yonkoo ui li lon kwa bangbup* [Research on the Theory and Method of Korean Dolmens] (Seoul: Chu Ryu Song, 2000).

⁷ Ha, Mun-sik, "The distribution and Structure of Dolmens in Northeastern China," *Ko Mun Hwa* [Ancient Culture] 50 (1998), 42-46.

the slopes of a lower mountain where there is a river or stream nearby. Valley plain sites have also occasionally been found. Dolmens in these areas are lined up along a river or stream. They are usually formed in a group, consisting of less than a dozen components, while the "northern style" (or, the tablet style) occasionally occurs as an individual piece. Dwelling sites located near dolmen sites are often found at slightly lower level than the dolmens, indicating that these dolmens are likely to be the tombs of the same kin group that has occupied the dwelling site.

III. Typology and Chronology

Dolmens in Manchuria and Korea can be classified into two large types, based on the density of dolmens. One is an individual type and the other is a cluster or group type. The individual type is mainly found in Manchuria and northwestern part of Korea, while the cluster type is predominantly reported from the southern Korea, that is, south of Han River.

In addition to the density of dolmens, one can also divide dolmens based on the typology of their structure. According to a classification of structural typology, three types of dolmens are recognized in Korea. The first one is the "northern type" or tablet-shaped type, distributed mainly on the Liaodong peninsula of Manchuria and on the Korean peninsula in areas north of the Han River, with its center located in northwestern Korea. The northern type is made of four upright stone slabs placed to create the sides of a cube, which is topped with a much larger flat capstone which protrudes on the four sides. Among the four stone slabs on each side, the one on the front of the burial chamber is easily removable, thus suggesting that it is the entrance of the chamber. In addition, since the rectangular shaped cube that was placed under the capstone itself is a burial structure, the northern type has the burial chamber above ground. Therefore, due to the characteristics of this specific structure, many examples of the northern type have been easily disturbed by environmental change or illegally opened.

The length of the cap stone ranges from four to eight meters, in some cases weighing 30 tons. The total height of the dolmens is from 1 to 2.5 meters. It is very interesting to note that the northern type dolmens usually stand individually, not in a group, in Manchuria and northern Korea, and also that excavations have only rarely yielded any burial offerings. This suggests that some of the northern type dolmens in Manchuria and northern Korea are not burials, but territorial markers, or religious altars.

The second type is the "Southern type" or "Chinese *go* checkers table type," found largely in southwestern Korea. The southern type, in its typical characteristics, has a burial chamber underground. The walls are constructed by stone slabs, or by a number of rock piles. The top is covered by large stone slabs, or in some cases by wooden logs. On the ground, above the burial chamber, there are rows of boulders supporting the dolmen capstone. The great difference between the southern type and the northern type is that there is a burial chamber underground in the case of the southern type.

The third type is the capstone-type. This type is similar to the southern type

in terms of the structure of the burial chamber. The only difference between the two types is that there are no supporting stones between the chamber and the capstone. Thus, in the case of the capstone-type, the capstone lies directly on the chamber. It is notable that the southern type and the capstone type are concentrated in southwestern Korea, and they are also much more numerous compared to the northern type.

In addition to the three types mentioned above, some Korean scholars have tried to attempt to classify the typology of Korean dolmens in more detail, based on types of burial chamber and of the capstones. Some have classified as many as ten or more types.⁸ I think that overly detailed classifications of dolmens in the Korean case without proper reason will cause unnecessary complications for the explanation of the cultural history of Korea, and instead of extending the typologies, future research should focus on what the functional differences and the reasons why the geographic distribution of different types of dolmens overlap.

Korean scholars have attempted to establish a chronological order based on the typology of dolmens. South Korean scholars argue that the "northern type" appeared first in the Liaoning area of Northeastern China and in the northwestern part of the Korean peninsula, and then, later, the "southern type" evolved from the "northern type." Scholars in North Korea have insisted on seeing it the other way around. Although there are no clear absolute dates from the sites in northern Korea, considering absolute date and artifacts found in South Korea, it still appears that the "northern type" is earlier than the "southern type."

It is assumed that the "northern type" first appeared in the Liaodong area or the northwestern part of Korea in about the 15th century B.C., that its construction reached the alluvial plains of the Han River in central Korea in about 10th century B.C., and then diffused to southern Korea in the 7th century B.C. On the other hand, the "southern type" gradually evolved within the Korean peninsula from the "northern type" from about the 10th century B.C., and was practiced until 4th century B.C. in the southern part of Korea. Based on this typology, there is, therefore, a great time gap between the northern and southern parts of Korea in terms of the first appearance and the last construction of dolmens.

IV. Socio-political implications

The function of dolmens has been discussed by many scholars. Some have argued that dolmens were stone altars constructed for megalithic religious activities, or that they were territorial markers, while others insisted that dolmens were regular tombs for the ordinary people in the bronze age. The first hypothesis has been based on the negative evidence that some dolmens did not yield anything but its capstone, and also on the fact that the size of the burial chambers under the capstones has generally seemed too small to accommodate a dead body in an extended posture. In addition, the number of dolmens are so numerous, that they cannot be considered the tombs of chiefs. I think that the scholars holding these views have failed to

⁸ Lee, Yong-mun, "Chonnam jibang jisokmyo sahoe ui yonku" (A Study on the dolmens in the Chonam areas). Unpublished Ph.D. Thesis, Korea Teacher's College, 1993.

consider the possibility of the dolmens as a secondary burial system. It can be argued that if dolmens are tombs for ordinary people, the cost for construction of the tomb was so high that the societies could not be sustained for a long time.⁹ But Korean dolmen-constructing societies existed for almost 1,000 years.

Most common artifacts found in the dolmen sites have been polished stone arrowheads, daggers, stone axes, grinding stones, semi-lunar knives, and various types of pottery belonging to the Korean bronze culture. Since these implements were found both in dolmen sites and at dwelling sites, there was no clear distinction between the burial offerings and household utensils – with the exception of the stone daggers. Among the artifacts in association with dolmens, most notable finds were guitar shaped-bronze daggers, bronze arrowheads, axes, and various forms of jade beads of which are possibly related to the use of prestigious goods. It is probable that some of them were imported from outside Korea. The bronze daggers, however, were definitely produced in Korea: Moulds for the daggers were found even in the southwestern parts of Korea, which are remote from Manchurian sites with a similar capacity. It is notable that most of these luxurious items were found in the burial sites in limited numbers.

Recently, scholars have determined¹⁰ that rather than common people, those buried under the dolmens were chiefs and their family members, or people having an equivalent economic/political capacity. This is inferred from the needs of the labor force required to quarry and transfer massive capstones of more than forty tons apiece. These scholars have argued that construction of the dolmens required a large force, food to feed the labor force, and a centralized sociopolitical authority capable of mobilizing and controlling the labour force.

The line of evidence for dolmens as a high-class or powerful persons' tomb derives from the detailed examination and analysis of available data from several sites in Cholla province, in southwestern Korea.

Here, the Chokyang-Dong site produced 29 dolmens which, based on their distribution on the site, could be divided into 6 different dolmen groups. In other words, although 29 dolmens were constructed in the same area, one can easily define a boundary between one group and the other. Among the dolmens of each group, guitar-shaped bronze daggers and other prestigious burial offerings were found only at the dolmen located in the center of each group. The size of their capstones and burial chambers are larger than other dolmens, so one can quickly identify the relative importance of these dolmens. It is assumed that those who were buried in this type of dolmens were in socially higher positions than the others.¹¹

Similarly, at the Panchon-ri site, the field excavation identified a total of 14 dolmen burial chambers, all sharing the same east-west orientation on the long axis within an oval-shaped boundary. The oval-shaped concentration of these burial

⁹ Choe, Chong-pil, "Chiefdoms and Korean Ancient History."

¹⁰ Choi, Mong-lyong, "Chronology of Dolmens in Chonnam Province." *Jin Dan Hak Bo* 53 (1987), 23–37, and "A Study of Yong San River Valley Culture" (Unpublished Ph. D. Dissertation, Harvard University, 1983); Choe, Chong-pil, "A Critical Review on the Korean Prehistory Based on Neo-Cultural Evolutionism," *Hankook sanggo sahak bo [Journal of Korean Ancient History]* 16 (1994), 1–24.

¹¹ Choe, Chong-pil, "Chiefdoms and Korean Ancient History;" Lee, Yong-mun, "Chonnam jibang jisokmyo sahoe ui yonku"(A Study on the dolmens in the Chonam areas), 126–42.

chambers was understood as implying that this dolmen site might be the cemetery of a family or a group of closely related families. Three paired dolmen burial chambers (i.e. dolmens no. 4 & 12; 6 & 11; and 13 & 14) were identified. Each pair was assumed to have been constructed contemporarily. While two pairs of dolmen burial chambers each shared a single capstone, the capstone or the capstones of the other two paired burial chambers were already missing at the time of investigation. Considering that the other paired burial chambers shared a single capstone, however, the burial chambers of Dolmen 13 and 14 were also believed to have shared a single capstone in their original undamaged context.¹²

The length of the long axis of the dolmen burial chambers uncovered at the Panchon-ri dolmen site are mostly between 110 cm and 150 cm, with an average of about 120 cm. Thus, none of the burial chambers were sufficiently large for burying a deceased adult in an extended posture. Unless the deceased were infants, it is reasonable to consider different kinds of postures other than that of an extended posture. Either burial in a flexed posture or secondary burial were considered as types that could accommodate the size of the burial chambers. Based on the extremely small size of burial chambers of the dolmens (80x30x20cm), and its pairing with the other dolmen chamber (110x50x20cm), some have interpreted the relationship between the two buried persons in the paired burial chamber of dolmens as that of a child and her or his mother or father. If this is the case, it can also be assumed that even a small deceased child was carefully treated separately by society because of his/her social status.

It is also important to point out that the construction of dolmens as commoners' tombs must have been so expensive for a Korean prehistoric society that it could not have been maintained over a long time.

V. Origins of Korean Dolmens

The origins and development of Korean dolmens is disputable not least because megaliths are found almost all over the world. Dolmens in northeast Asia first appeared in northwestern Korea and southwestern Manchuria from about 1,500 B.C., within the Bronze Age cultural complex, and they continued to be built in southern Korea up until about 400 B.C.

Until the 1960s, some western scholars have insisted that the home of megalithic culture in Northeast Asia was Japan, and that they diffused there from western Europe through the Mediterranean and India.¹³ Based on the above hypothesis, some concluded that the dolmens in western Europe diffused along the coast from India and China to Korea, and that is why there are no dolmens in the interior of China or the Asian continent.¹⁴

Recent research has suggested that there are three main hypothesis concerning the origins of Korean dolmens: 1) the southern coastal route, 2) the northern

¹² Choi, Mong-lyong, "A Study of Yong San River Valley Culture."

¹³ Daniel, *The Megalithic Builders of Western Europe*, 124.

¹⁴ Kim, Jae-won & Yoon, Mu-byong, *Hankook jisokmyo yonkoo* [Korean dolmens] (Seoul: National Museum of Korea, 1967), 19.

continental route and 3) independent development. According to the southern coastal theory, megaliths in India originated from western Europe, gradually diffused toward west to Korea through the coastal lines of Southeast Asia across lands with rice cultivation. Kim, in particular, asserted that there was migration from India and Southeast Asia to the Korean peninsula during the Bronze Age. He suggested that the skeleton found in the chamber of dolmens in Oksok-ri is not indigenous Korean but of a distant Asian-Indian origin,¹⁵ but it has turned out that his research on the skeleton was not based on modern methods of bio-chemical analysis.

The northern continental diffusion theory was based on the fact that the burial chambers of Korean dolmens is very similar to the structure of the stone cist burials that appeared in the Baikal area during the late Neolithic (3,000–2,000 B.C.) and in the Siberian Bronze Age Karasuk culture of about 1,300–1,000 B.C. Those who insisted on the northern hypothesis relied upon several lines of evidence. First, the Comb-Pattern pottery in the Korean Neolithic period appeared to have originated from that of the Baikal areas in Siberia, and, furthermore, Korean bronze technology was introduced from the Karasuk culture of Siberia. Secondly, it is surmised that there was a series of large migrations from Siberia toward the Korean peninsula during both Neolithic and Bronze Age periods. According to this migration theory, the inhabitants of Neolithic Korea who produced the “geometric pottery” (the Comb-Pattern pottery) were Paleo-Asian ethnic groups that had arrived from the Baikal area of Russia. They were later absorbed or expelled from the peninsula by other ethnic group called Ye Maek or Tungus, who came from Manchuria and the central Asia.¹⁶

The problem with the above hypothesis is that it seems, so far, that few megaliths or dolmens in Central Asia or Siberia have been found which can be dated to the Neolithic period or the Bronze Age, though stone cist burials are occasionally reported.

The independent origins or indigenous development theory is supported by the geographic distribution of dolmens, and the burial offerings. According to the independent development theory, the Korean dolmens were created as a form of tombs during the Bronze Age by indigenous people in the present-day area of northwestern Korea and southwestern Manchuria. These indigenous people established a “kochosun” state, which appeared both in Korean and Chinese historical records as the earliest city state in Korean history. Thus, distribution of dolmens in East Asia is confined to, and mainly concentrated in, the habitation zone of Bronze Age Koreans. The geographical distribution of the guitar-shaped bronze dagger, a characteristic of the Korean bronze cultural element, as well as the Korean pottery also overlaps with dolmens.

It is highly probable that the Korean dolmens were developed indigenously. Several lines of inquiry lead our attention in directions that do not fit the migration and diffusionist theories. First, why should dolmens spread only to the Liaodong and Korean peninsulas, but not to the coastal areas of China? Although dolmens

¹⁵ Kim, Byong-mo, “On the Origins of Korean Megaliths.” *Hankook koko hakbo* [Journal of Korean Archaeology] 10, 11 (1981), 55–78.

¹⁶ Kim, Jung-bae, *Hankook kodae kooka ui hyongsung kwajong* [The formation of the ancient state in Korea] (Seoul: Korea University Press, 1986), 57–58.

are reported in the Zhejiang and Shandong provinces of China, their number is extremely limited, and there are large geographical gaps between the coastal areas of Southeast Asia and Zhejiang province, as well as also between Zhejiang and Shandong. Moreover, the absolute dates of Southeast Asian dolmens fall in the 5th century B.C., while Chinese dolmen construction ranges from the 5th century B.C. to the 2nd century A.D., much later than the Korean dolmen traditions. Secondly, why should dolmens be found only in the Liaodong and Korean peninsulas, but not in central Asia, central China, eastern Russia or in Inner Mongolia? For us to accept a postulated continental route of diffusion from Europe, dolmens should also first have been found in the above-stated areas, since these areas are gateways leading to the Korean peninsula. There are occasional reports of megaliths from these areas, but they are not Korean type of dolmens. Third, why did only dolmen construction itself diffuse from the adjacent areas, but the traditions of burial offerings? Burial offerings, together with burial construction, are crucial forms of evidence in the identification of ethnic groups. As mentioned earlier, dolmens in Korea yielded typical sets of Bronze Age artifacts not found in other areas.

It is thus suggested that during the Korean Bronze Age it was not the case that an ancient "Silk Road" connected Chinese or Korean dolmens on the one hand, with those of Europe on the other.

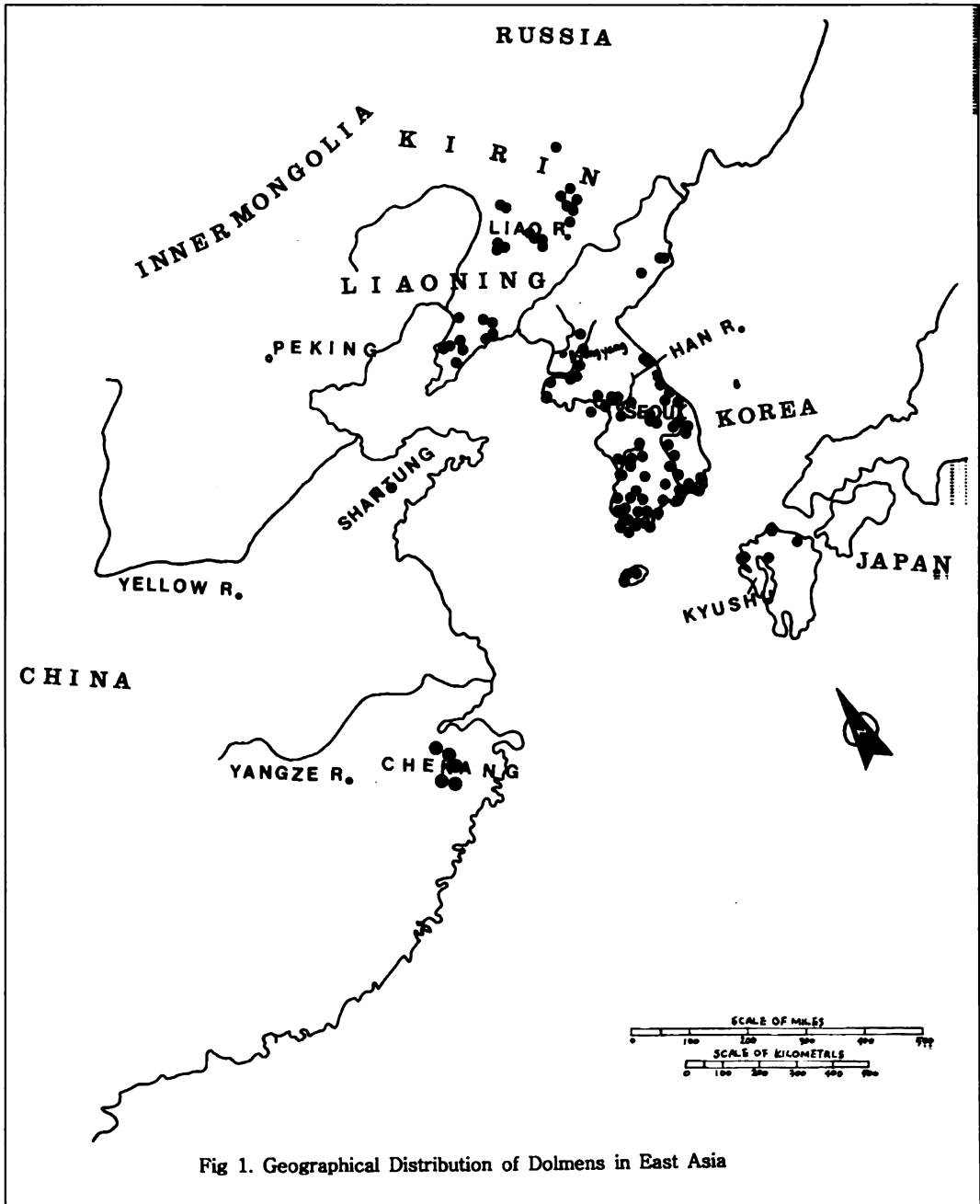
VI. Concluding remarks

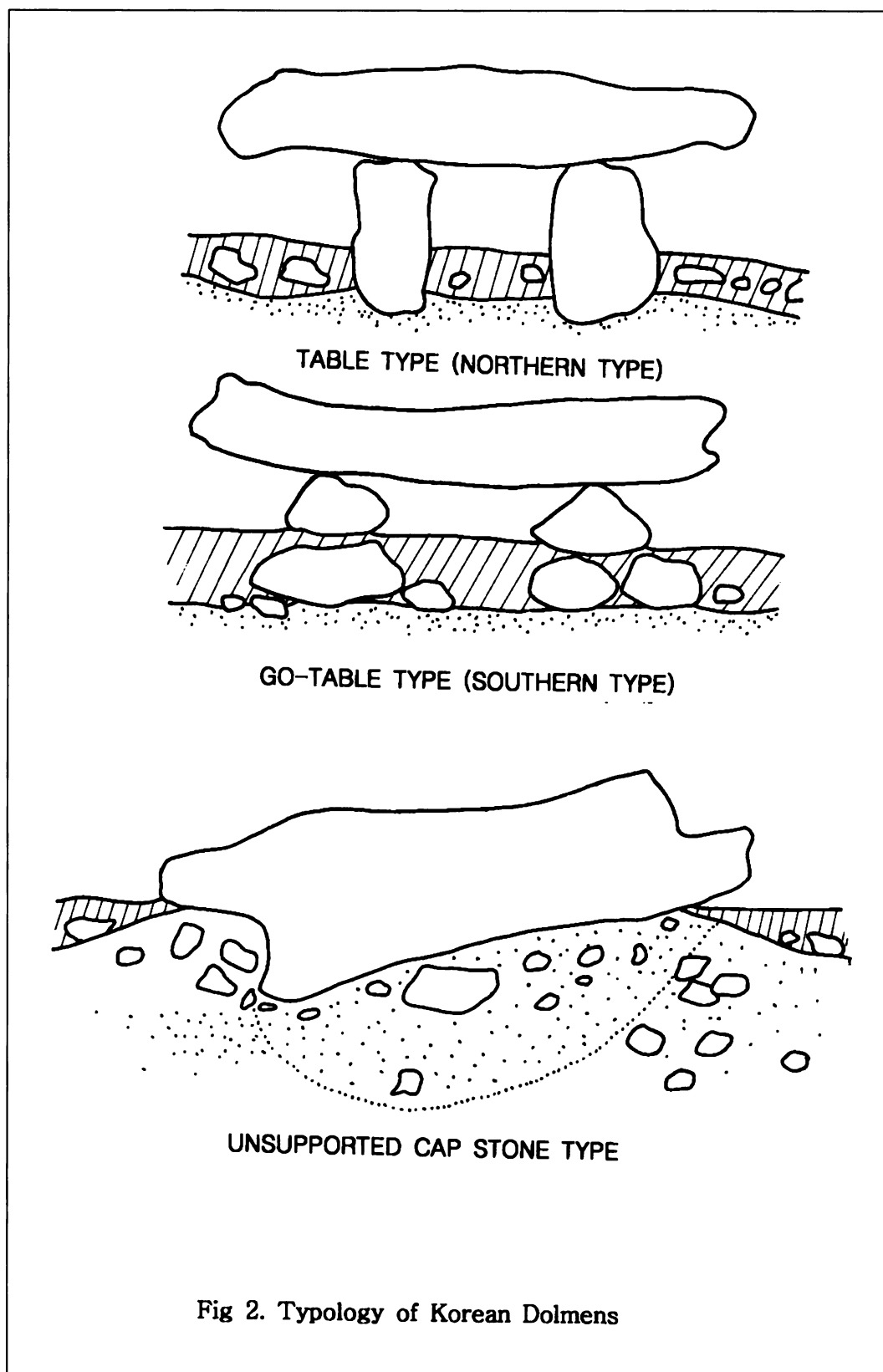
Research to clarify the origins of Korean dolmens and their possible associations with European prehistory is not an easy task, based on the data available to us at present. The research has to focus on geographic distribution, typology, construction methods, chronology and functions of dolmens from both sides. But it is clear that the diffusionist theory that Korean dolmens originated from western Europe must be reconsidered, if not rejected.

Dolmens are a worldwide megalithic cultural phenomenon. They appear in Africa, and even in the New World. The earliest megaliths, such as dolmens, menhirs, circle stones, and stone alignments first appeared in England and France as early as in the 5th millennium B.C. and gradually diffused to the neighbouring countries such as Denmark, Sweden, Netherlands, Spain and Portugal. It is, however, questionable that megaliths in northeast Asia ever had a historical relationship with those of Europe. The distance between both areas is too far to trace back the origins. Thus the origins of Korean dolmens is not to be determined for the moment, but it is likely that they were a local development that combined an inspiration derived from the Siberian cist burials with indigenous invention based in local configurations of megalith-related animistic practices. The further study of the different types of dolmens, in which differences were caused by function, time gap, and a regional or cultural variation, will help us understand the developmental stages of dolmens in Korea. Also, the necessary control of manpower and resources to construct dolmens supports the hypothesis that the construction of dolmens played a great role in the evolution of Korean society, from egalitarian to stratified society.

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Origins of the Image of a Predator Rolling up in a Ring in the Portable Art of Central Asia

by

Evgeny Bogdanov

More than 30 years ago, V. Ilyinskaya¹ described the image in the portable art of Central Asia of a predator rolling up in a ring as one of the most peculiar and original images, not borrowed from any other culture. Instead, and based on a theory that the core of any culture comprises its most significant cultural phenomena, this original image should be considered an essential component of the main body of images within the Scythian Animal Style. The attention of researchers of history and art to this image over more than a century is thus understandable, and in this article we should like to examine it yet again.

Currently, several areas of dispersal of this iconographic pattern have been identified:

- 1) China (Plate 1, figures 1–12, 22–24);
- 2) Western Central Asia (fig. 13–21, 25–29, 39–43) and Kazakhstan (fig. 34–38);
- 3) Western Siberia (fig. 49–51);
- 4) The Kama Basin, Lower Volga Basin and Southwest Ural area (fig. 53);
- 5) The Caucasus and the Middle East (fig. 30–33);
- 6) The Kuban and Dnieper River basins and the North Pontic area (fig. 44–46)

In the middle of the 20th century, Karl Jettmar and Hans-Georg Huettel put forward a hypothesis that this image of a predator as seen in the Scythian Siberian Animal Style was formed on the basis of Chinese “ring-shaped zoomorphic compositions.”

² Many contemporary researchers share this opinion.³ This hypothesis is based on

¹ V.A. Ilyinskaya, “Obraz koshachiego hischnika v rannekifskom iskusstve,” *Sovetskaya arheologia* [Moskva], Vol. 2 (1971), 78.

² G.N. Kurochkin, “Izobrazheniya svernuvshegosya hischnika v tagarskom iskusstve,” In *Kratkie soobshcheniya instituta istorii mirovoy kulturi* (Institute of the history of world culture, Academy of Sciences, Sankt-Peterburg), Vol. 207 (1993), 67.

³ G. Kossack, “Anfänge des skytho-iranischen Tierstils,” in Herbert Franke, ed., *Skythica: Vorträge zur Entstehung des skytho-iranischen Tierstils und zu Denkmälern des Bosporanischen Reichs anlässlich einer Ausstellung der Leningrader Eremitage in München 1984* (München: Bayerische Akademie der Wissenschaften, 1987), 29.

Chinese jade adornments which show “a dragon biting its own tail” (Plate 1, fig. 4), for instance, the items recovered from the Fu Hao burial of the Shang dynasty at Anyang in Henan Province, central China. A pendant from tomb 60 of the site of Fensi, in Hebei Province, can serve as another example (Plate 1, fig. 3). Such circular zoomorphic ornaments made of jade are deposited in museums and private collections in Europe and America (Plate, 1, fig. 7). Most of these ornaments date from the Shang Dynasty.

A question arises concerning identification of the images on jade discs. Some researchers regard these images as depictions of a dragon “biting its own tail.” They interpret such images as “depictions of basic events linked with the philosophy of existence as an eternal succession of genesis, destruction and resurrection of the Universe”, and as representations of how “a monster is swallowing the Sun, and is getting hold of the Moon with its tail.”⁴

Sergey Alkin interpreted the C-shaped jade sculptural pieces from the northeastern China dating from the Neolithic period (V–III millennium BC) as depictions of insect larvae, illustrating the idea of birth.⁵ Insects are the only class of living things, which undergo metamorphoses of complete alternation of appearance during their life cycle. Thus, insects represent “the unique natural illustration of the sacral topic of destruction and revival, birth, death and resurrection”. Larvae grow up in the earth, while mature insects live on the ground and even fly. Additionally, larvae of many taxa resemble the shape of mammalian embryos. In fact, in most cases the images of jade discs are schematically outlined, no extremities are usually shown, a big head and a vague body-tail being their most characteristic features (Plate 1, fig. 1, 2).⁶

In China, the Neolithic tradition to decorate various objects with such images was developed both in stone and in metal. During the period of the Shang Dynasty, such images served as decorative elements on bronze vessels, that is, a beast (which the majority of contemporary specialists have considered to show a dragon). It was depicted without extremities, but the element of “biting the tail” was already present (fig. 5, 6). Starting from the 6th century BC, the images of animals had finally got the circular shape (fig. 22–27), along with a thoroughly worked-out relief of the animal’s figure, while stylistic elements typical for earlier tradition (i.e. decorative volute) were seldom used.

An analysis of the available materials supports the hypothesis of borrowing of the image of an animal a rolling up in a ring from early Chinese art. Some researchers have raised objections to this hypothesis on the ground of a sheer absence of intermediate evidence of borrowing: “chronological gaps are too long for the cases

⁴ V.E. Larichev, et al., “Bozhestvo iz Karakana (opyt astralnoj interpretatsii kanonichnogo obraza),” in *Problemy arheologii, etnografii i antropologii Sibiri i sopredelnykh territorij* (Novosibirsk: Institute of Archaeology, Russian Academy of Sciences, Siberian Branch), Vol. 8 (2002), 371–72.

⁵ S.V. Alkin, “Entomologicheskaya identifikatsia hunchanskih nefritov,” in *III godovaya sessia Instituta arheologii i etnografii*. (Novosibirsk: Institute of Archaeology, Russian Academy of Sciences, Siberian Branch), 1995, 14; “Arheologicheskie svidetelstva sushestvovaniya kulta nasekomi v neolite severo-vostochnoi Azii,” in *Drevnie kul'tury severo-vostochnoi Azii* (Novosibirsk: Institute of Archaeology, Russian Academy of Sciences, Siberian Branch), 2003, 135.

⁶ Alkin, “Arheologicheskie svidetelstva sushestvovaniya kulta nasekomi v neolite severo-vostochnoi Azii,” 139–40; fig. 2.

suggesting direct continuity.”⁷ However, recently new evidence has been obtained.

Thus, a knife with a pommel depicting a rolling-up beast of prey has been recovered from the Inner Mongolian site of Nanshangen, tomb 101 (fig. 8), and a plaque from Siaoheishigou in 1985 (fig. 9), also in Inner Mongolia, both dating from the 9th–8th centuries BC. These age estimates appear reliable, because the objects were found in association with objects of Scythian affinity, and Chinese items of clear chronological affiliations. Pertinent images on “deer stones” dating from the early 1st millennium BC have been recorded from Arkhangai and Bayan-Hongor Regions in Mongolia.⁸ It is noteworthy that these images portray animals without clear characteristics that suggest the features of a predator. For instance, the plaque from Siaoheishigou was dated to the 9th–8th centuries BC on the basis of associated grave goods. This image (e.g., fig. 9) can be considered as a transitional depiction from the Chinese ring-shaped zoomorphic compositions and the images from the Minusinsk Basin in Southern Siberia (fig. 13–17). Other analogous examples include the piece from Ordos from the former collection of S.T. Loo (fig. 10), a practically identical example of unknown affiliation from the collection by A.M. Sekler, and one more plaque from the same collection which reportedly derives on the border between northern Hebei and eastern Liaoning.

Most of the plaques from the Minusinsk Basin (fig. 13–16) represent similar images, lacking any clear characteristic features of a predator, and dating to the 8th–6th centuries BC. Most of the early images (the 7th century BC) are made in a single style. Such images have been recorded from the forest-steppe zone of Ukraine, from the North Pontic area, from the northern Caucasus (fig. 32–33) and from Kazakhstan (fig. 34–38), and similar items have also been reported from the Middle East (fig. 30).

The basic idea of all such images is the depiction of a curled-up animal: All the pieces show long muzzles with a circular or sharp-pointed ear; the eyes, the tip of the nose, and the paws are marked with small circles. The body ends in a short tail, with a circle at the tip, which does not resemble a predator’s tail. The depiction is composed in such a way that the muzzle, the body and the tail forms a circle, and the paws are shown in the very center of the circle. The symbolic smooth and rounded forms of the body and the pose are traditional features, making the whole object similar in shape and semantics to the Chinese jade discs bearing ring-shaped zoomorphic images. The noted common features suggest the existence of a particular canon in a composition pattern depicting an animal in the position of a “foetus in a womb.”

It is noteworthy that most of the animals on the plaques of the Minusinsk set, except three specimens from the Beiski fort (fig. 18) are shown rolling up counter-clockwise. At the present state of knowledge, it is hard to say for sure whether this is a mere coincidence, or if it reflects some complex ritual-mythological ideas.

⁷ M.N. Pogrebova et al, *Rannie skify i drevnij Vostok* (Moskva: Izdatelstvo Nauka, 1992), 121; E.V. Perevodchikova, *Iazyk zverinih obrazov. Oчерki iskusstva evraziyskih stepey skifskoj epohi* (Moskva: Izdatelstvo Vostochnaya literatura, 1994), 138.

⁸ V.V. Volkov, “Olennie kamni Mongolii,” (Ulan-Bator: Izdatelstvo Akademii Nauk Mongolskoj narodnoj respubliky, 1981), 127, 157, 192.

Also, a considerable proportion of the relevant objects were found in a disturbed archaeological context, or lack any such context.

The idea of ancient depictions of predators rolling up in a ring is clearly based on the central-rotational symmetry of the image. It is reminiscent of the idea of a "wheel of history", or "Ananka's spindle," as marks of constancy of life and fate in contrast to the infinite changeability of everyday life realizations. This idea fits perfectly with the mathematical properties of a circle: To remain unchanged through perpetual rotations around its center. The diversity and constancy of life is symbolized by a "wheel of history" rather than a "square" or a "triangle of history," but this is a topic of the role of geometric archetypes in various cultures, in the Scythian-Siberian art in particular.

However, one topic attracts our special attention. It is the topic of transformation of a curled-up animal into a feline predator. Apparently, this transformation occurred at an early stage of the development and dispersal of this iconographic pattern. The Arzhan panther has been recovered from the Arzhan burial mound (in Tuva) dating from the 8th (or the 9th) century BC. The image of the panther shows the accentuated features of a beast of prey: a grinning mouth showing the teeth, claws on the paws instead of traditional circles, a long tail⁹ (fig. 19). An identical plate (however, of poor quality, and fractured) has been found in Mongolia.¹⁰ (It could hardly be interpreted as a "shield decoration,"¹¹ because such a tradition was not typical for Siberia and no supporting archaeological evidence has been found.)

The large size of these plaques, and the fact that these specimens represent the earliest examples of horse harness decorations, are noteworthy. The objects from the Minusinski basin (fig. 13–18) date back to the 7th–6th centuries BC, just as the finds from the southwestern Altai region (fig. 20) and China (fig. 22–23). The predator is shown "biting its own tail" in the same way as in the early Chinese and Central Asian specimens. The lithe body of the predator is accentuated: The extravagant long body as well as the neck is curved so that the head approaches the tail, while the paws and the tip of the tail are inside the circle, or the oval, formed by the body. The shoulder is shown as a rounded relief; the thigh is depicted by means of a wrinkle. The image hardly bears any features of stylization. Many researchers designate this artistic manner "realistic," concluding that "the artisan knew the appearance and behavior of the real animal perfectly," and so forth.

The reasons underlying the transformations in the form of depiction of the rolling animal, and consequently in the structure and the meaning of this image, are probably linked with the general processes of transformation of symbolism of the cultures of the Scythian affinity. The transformation of the image of this type of animal into the image of a feline predator could be related to the tradition of depicting of a predator of the so-called "Helanshan" beast type, a tradition which existed in Central Asia as early as the beginning of the 1st millennium BC. The image

⁹ Griaznov, M.P., "K voprosu o slozhenii kultur skifo-sibirskogo tipa v svyazi s otkrytiem kurgana Arzhan," in *Kratkiye soobshcheniya instituta arheologii*, [Institute of Archaeology, Academy of Sciences, USSR] Vol. 154 (1978), 9–18, fig. 4.

¹⁰ Volkov, "Olennie kamni Mongolii," 115.

¹¹ G.I. Borovka, *Scythian Art* (London: E. Benn Ltd., 1928), 102.

represents an imaginary animal with an open mouth showing the teeth, and a long curved tongue like that of a serpent. Its body shows transverse or curved strips, probably imitating the strips of a tiger. Such an image is recorded from petroglyph sites in the mountains of Helanshan (in China's Ningxia Province), Heishan (Gansu Province) and of the northern Ordos, dating to the 9th–8th centuries BC (fig. 3–9).¹² Similar images are reported from the “deer stones” in North Mongolia: Ushkin-Uver, stone 15; the Zhargalant sanctuary, stone 23; “Hushot uvged brigada”, stone 2 (41);¹³ the Zargalant-90, kerb 2, stone 9.¹⁴ Other deer stones bear the images of the rolled-up animals of the Mongolian–Trans-Baikal type. Pogrebova and Rayevski are right identifying these pictures as “depictions of the objects decorated with the images in question, e.g. bronze plaques of the Arzhan type.”¹⁵ Mythological ideas of a “fierce beast-eater,” mostly of Iranian origin, which existed in the steppe zone of Eurasia during the Early Scythian Period, were reflected not only in petroglyphs and monuments, but also in the portable art.

In summary, iconographic and chronological evidence supports the hypothesis that the image of the beast rolling up in a ring appeared and dispersed over the territory of Central Asia under the influence of the Chinese artistic tradition (see Fig. 1). Nomads transformed the image of an animal rolling up in the pose of a “foetus in a womb,” which was not clearly understandable, into the image of a feline predator, which served the purpose of decorating particular objects.

¹² A.A. Kovalev, “O proishozhdenii olennih kamnej zapadnogo regiona,” In *Arheologiya, paleoekologiya i paleodemografiya Evrazii* (Moskva: “Nauka”: 2000, 13–81).

¹³ Volkov, “Olennie kamni Mongolii,” plate 40: 1; 78; 94.

¹⁴ Volkov, “Rannie kochevniki Severnoj Mongolii,” in *Mirovozzrenie drevnego naseleniya Evrazii* (Moskva, 2001), fig. 6.

¹⁵ Pogrebova et al, *Rannie skify i drevnij Vostok*, 121.

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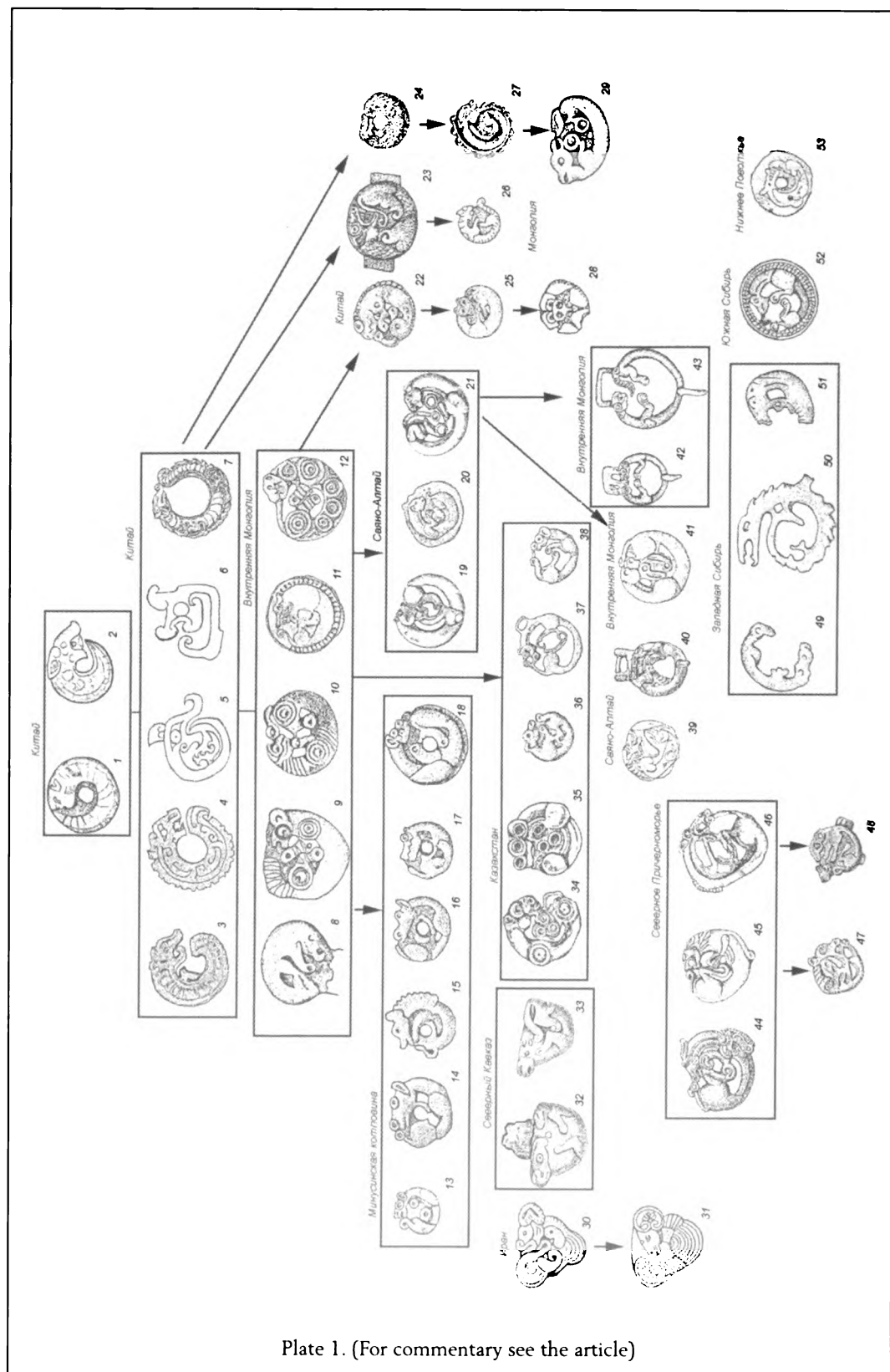


Plate 1. (For commentary see the article)

Johan Gunnar Andersson's Systematic Research on Fai Tsi Long Archipelago Archaeology and the Andersson Collections Kept in Viet Nam

by

Nguyen Kim Dung

I. Introduction

Johan Gunnar Andersson, the Swedish geologist and archaeologist, was the first scholar to undertake scientific and systematic research on both the geology and archaeology of the northeast coast of Vietnam, except for the research previously conducted by his French colleague Madeleine Colani, who also studied the Fai Tsi Long area (today's Ha Long Bay).

During 1938–1939, Andersson spent more than 6 months travelling and undertaking research around Ha Long Bay, his aim being to explore the sites that had been discovered by Madeleine Colani before, and to make “an independent study of a unique topographic region on the coast of Tonkin.”¹ During this time, he excavated several open-air sites on the coast of Fai Tsi Long and also conducted numerous valuable studies on the origin of limestone caves. Three open-air sites were excavated, and seven limestone caves were explored. The bulk of these collections, including stone tools, pottery and other materials from such sites as Danh Do La, Dong Mang (Dong Mau), Xich Tho, Grottoes des Ciseaux cave (the Duc cave) are preserved in Viet Nam. Based on Andersson's publication, “Archaeological research in the Fai Tsi Long Archipelago, Tonkin,” as well as careful studies of more than 1000 artifacts excavated by J.G. Andersson and a comparison with the several collections excavated nowadays; this paper aims at presenting Andersson's collections and showing his great contributions to Viet Nam archaeology. The author also expects that all Andersson's works and his archaeological collections in both Sweden and

¹ J.G. Andersson, “Archaeological research in the Fai Tsi Long archipelago, Tonkin,” published as one part of his “Topographical and Archaeological studies in the Far East,” *Bulletin of the Museum of Far Eastern Antiquities* 11, 1939, 75–107.

Viet Nam will be widely published soon, as a record of the scientific work Andersson undertook in Viet Nam.

J.G. Andersson emphasized the important role of sea-level changes in the Pleistocene and Holocene, along with their influence on the living conditions of the people of these eras. Also, in the course of his research, Andersson distinguished two types of prehistoric sites: caves and open-air sites. Some of these were also settlement sites. The latter are characterized by their different locations, either in caves or in sand dune locations, the different lifestyles subsistence economies of the people who lived there, and, more important, their cultural deposits. When studying the caves, the appearance of freshwater shells such as *Melania sp.* found in the limestone caves was especially emphasized by Andersson, who noted that freshwater shells accounted for 90% of the diet of the cave inhabitants.

As for the open-air sites, Andersson was the first scholar to mention the particular features of this site type, such as the popularity of soft pottery and of shouldered and stepped axes. Among these sites, the three which he excavated and called the Danh Do La Culture, are especially interesting. Andersson was the first archaeologist to identify this new culture.² It is now called the Ha Long Culture by Vietnamese scientists, and the name is used for more than 20 sites located in the Ha Long Bay area with the same characteristics.

We can say that J.G. Andersson contributed a valuable chapter to the geology and the prehistory of this area.

II. Andersson's excavations and collections in Viet Nam

II.1 Andersson's excavations

Three open-air sites (Danh Do La, Xich Tho, Dong Mau³) were excavated during Andersson's research in Ha Long Bay, with the cultural features mentioned above.

The Danh Do La site: This site was the first site excavated by Andersson in the Ha Long Bay area. The site is situated about a kilometre north of a vast sandy beach, facing the open sea, and it is not so far from the Dong Mau site. The site is found below the surface, at 4 to 5,5 metres above the high water level. The size of the site at the time of occupation was 150m by 45m. The square area systematically excavated in the easternmost parts of the site is 50 square metres. When studying this site, Andersson showed that the ancient local people could have access to the sea easily from the site, in three directions. He discovered this site himself and noted that the pottery found there was of a type "so far unknown."

The experimental excavation showed that the cultural layer of this site is about 70cm in thickness, rich in pottery and stone tools. The most important point that he realised was that, at the time the Danh Do La people settled on the site the sea

² Andersson, "Archaeological research in the Fai Tsi Long archipelago, Tonkin," 78, 98, 100 ff.

³ In Vietnamese, Dong Mau is often called Dong Mang; and Danh Do La is called Ngoc Vung.

level was two metres higher than in 1938. The dating of the site was not determined at the time, though Andersson wished that someone would analyse the volcanic samples.

The Dong Mau site: This site is close to the western part of Port Courbet. Here, Andersson discovered pottery and axes similar to the objects found in Danh Do La. Because he realised that Dong Mau is a rich and highly promising settlement site, Andersson decided that the excavation at the Dong Mau site was even more necessary, and this site were excavated from March 21–31, 1938, when a rich collection of objects were found. Andersson also bought many objects from the local people. He always paid much attention to the geological situation of the site, and described the site as located about 15–20 metres above sea level in the southern part. The site occupies the northern and lowest part of a spur, and has a rectangular shape. Andersson carried out several test pits, recorded E1 to E11. In the northern part, after a big excavation in pits numbered F1 and F2, he found a rich cultural deposit with a thickness of about 40–60 cm.

The Xich Tho site: Also located within the Port Courbet area, the Xich Tho site was considered a promising site. It was situated on the northern shore of Port Courbet where, alongside the Man river, a narrow tidal channel was bordered by immense flats. The Thanh Mac (the Mac Citadel) is one half of a kilometre east of the site. Stratigraphically, the cultural deposits of Xich Tho are similar to Danh Do La, or Dong Mau. It is about 60–70 cm in thickness. Following Andersson's directions, one of his assistants made a big test pit and also found a rich array of objects.

In his publication, Andersson did not comment in detail on the objects. Most of his interest and concern was related to topographical description and issues. He wrote that "the age of these cultures and their ethnological affinities can be discussed only after a complete examination of the extensive collections."⁴ But his conclusions regarding the general features of the sites are still valuable in today's research.

Andersson called the people who lived on the open sites Isthmus Dwellers. Though there was no evidence such as fish bones or animal bones, he believed that the people here had been fish-eaters; in these Isthmus villages of Danh Do La, Xich Tho, and Dong Mau, the inhabitants had been obtaining most of their food from the sea; the Danh Do La Culture people were fishing communities. Andersson pointed out that at the time when the sites were occupied, the sea was 2 metres lower than the sites themselves. The result of his collections also showed that his opinion was quite right.

II.2 Andersson's Collections

In the Vietnamese Museum of History, Andersson's collections are preserved together with the collections made by Madeleine Colani and other foreigners during the early

⁴ Andersson, "Archaeological research in the Fai Tsi Long archipelago, Tonkin," 105.

part of the 20th century. They have contributed important historical materials to the study of Vietnam's prehistory.

A systematic analysis of Andersson's collections was undertaken early this year (2003). Abundant artifacts consisting of stone tools, pottery, bones, etc. were studied, photographed, and drawn. There are at least four separate collections excavated or collected by J.G. Andersson kept in the Museum: Danh Do La, Dong Mau, Xich Tho, and Grottoes des Ciseaux; as well as another large collection of objects which he collected or purchased from Ha Tay province, in Western Ha Noi.

The Danh Do La collection: This is kept under the number 67D of the Museum's storage. They include a number of sea-shells; one piece of animal bone; one pebble tool, one fishing net equipment made of small stone pebbles, 26 stone objects used as hammers, anvils or paddles, some with polishing marks; 19 unfinished stone tools made of stream pebbles and coarse stone; 15 table-grinding stones; 18 grinding stones with grooves (with Ha Long mark); 5 pieces of flat fine stone, similar to a type seen at other Ha Long sites; 4 stepped and shouldered axes; a short axe with a polished edge; and 2 rectangular axes.

The Dong Mau collection: This contains 418 grinding stones, of which 363 grinding stones with grooves; 50 shouldered axes; 15 shouldered and stepped axes; 21 broken axes; one rectangular axe; a dish-core; 6 hammers; 3 anvils; one piece of bracelet; 2 stone pieces with drilled holes.

The Xich Tho collection: 110 grinding stones; 14 paddles; 33 shouldered axes; 2 rectangular axes; 4 shouldered and stepped axes. (See fig. 1 and 2).

In addition to these collections, dominated by stone artefacts, there are 3 boxes containing many pieces of soft pottery found in the three above sites. We analysed all of them and understood that Andersson had tried to distinguish the different features of his Danh Do La culture from other cultures in Viet Nam prehistory.

III. Comparative study

According to Andersson's research, in Fai Tsi Long (Ha Long Bay), there were two different styles of the archaeological sites: caves, and open-air sites. Most of his research concerned open-air sites, therefore, we would like to compare his collections to other Ha Long Cultural collections.

From the 1970s up to now, more than 10 new excavations of archaeological sites in the Ha Long area have been conducted. Many sites share the same features as Danh Do La, Dong Mau, and Xich Tho. The result of recent research can improve

⁵ Nguyen Kim Dung et al, *Report of the second excavation at the Bai Ben site* (Hanoi: Institute of Archaeology, 2001); Nguyen Kim Dung 2001b, "New perceptions from two excavations at the Bai Ben stone workshop site, Cat Ba Island," *Khao Co Hoc* No. 4, 2001, 3–24.

our understanding of Ha Long Culture, which can be divided into 2 sub-periods. The earlier period can be seen in the site named Thoi Gieng, situated in the northeastern part of Ha Long Bay and dated to ca. 5000–4500 BP. The later period has been dated to ca. 4000–3500 BP. In this period, the Ha Long Culture people settled near the sea, near the beaches with sand dunes, and their life was mainly based on the sea. Many sites belong to this period, including Danh Do La, Xich Tho, and Dong Mau.

Recently, several excavations were conducted by myself on the Cat Ba Island in eastern Ha Long Bay, such as the Bai Ben site (excavated twice in 1999 and 2001), the Bai Cat Don site (excavated October–November 2003). A considerable amount of stone tools were found.⁵ Of special interest is that we found retouching points including cores with polishing marks on the surface of the used edge.

The collections of Andersson, no doubt, represent different stages of Ha Long Culture. His contributions to Vietnamese prehistorical research became a basic lesson for our archaeological research. In my country, not only archaeologists and historians who have their responsibility to build up our cultural heritage, but also many Vietnamese citizens know his contributions through the exhibition in the National Museum of History. I myself wish very much that all his collections, both in Vietnam and Sweden⁶ will be published in the near future. I am confident that the publication will be very useful and will be welcomed in Vietnam and in the world.

⁶ *Editor's note:* From the Swedish side, we can only second this, and hope that the preliminary Swedish contributions made so far will be followed by more research. The portions of Andersson's collections from Vietnam brought to Sweden in the 1930s are housed at the Museum of Far Eastern Antiquities in Stockholm, where they are available for more research. They are listed in Andersson's original handwritten "K catalogue" for all MFEA collections made 1926–59, from the start of Andersson's tenure as Director, which has now been scanned and is available on CD. They are also, but so far only partly, included in the new comprehensive public digital catalogue of all the museum's collections. Also, in 2002, a small selection of the Andersson objects were included in the special exhibit of Southeast Asian archaeology at the museum in 2002, *Glimpses of Southeast Asia*. A catalogue with the same name was published with photos of some objects, and a summary regarding "Johan Gunnar Andersson and Southeast Asian Archaeology." (See *Glimpses of Southeast Asia*, Museum of Far Eastern Antiquities Exhibition Catalogue No. 55. [Stockholm: MFEA, 2002]).

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Trinh Nang Chung, Nguyen Kim Dung and Nguyen Gia Doi. "The archaeological caves discovered recently on Cat Ba Island." In *New Discoveries on Archaeology in Viet Nam 1999*. [Hanoi], 2000, 143–45.



Fig. 1.

Stone adzes collected by Andersson at the site of Xich Tho in 1938, now in Hanoi.



Fig. 2.

Stone implements collected by Andersson at the same site, now in Hanoi.

Editor's note: Compare the similar objects in the Museum of Far Eastern Antiquities, esp. no. 9–12 displayed in the exhibition *Glimpses of Southeast Asia*, at the MFEA in 2002, and on p. 17 in the catalogue (see note 6, above). (Andersson called them “whetstones” after the very similar but significantly larger stone objects found on the Swedish island of Gotland, but also once suggested that both may have been implements of magic).

Swedish Archaeology and the Archaeology of Long- Distance Trade

by

Nils Ringstedt

I have been invited to say a few introductory words about Swedish archaeology and the archaeology of long-distance trade at this workshop. Let me first emphasize that Chinese history and culture has for many years interested me. Actually, my first visit to China and the Far East was already in 1955, when I worked as a deck-boy on the Swedish merchant ship M/S Minikoi belonging to the Swedish East Asia Company.

The Swedish Archaeological Society was formed in 1947 and comprises at present 639 active archaeologists.¹ The first chairman of the Society was professor Bernhard Karlgren, famous for his research in the Chinese language and his reconstruction of the ancient Chinese language, and on Chinese bronzes, among other things.

In 1947 Sweden lacked a scientific association in the archaeological field, in contrast to the situation in other comparable countries. Therefore the Swedish Archaeological Society was formed for archaeologists well known for important scientific results. The society is today the common body for all professional Swedish archaeologists, regardless of specialty. People of great merit within the archaeological sciences may be accepted as members.

The purpose of the Society is to further and to support Swedish archaeological research, among others by granting scholarships through two funds. The Society shall especially take care of the vocational interest of the archaeologists. This task shall be carried out by taking part in the public debate, by influencing the public opinion and by serving as a body to which proposed measures are submitted for consideration.

Currently the Society arranges discussions and seminars on different archaeological topics of interest to archaeologists. Every second year the Society holds a thematic meeting for Swedish archaeologists. Over time the Society has published, among other things, archaeological bibliographies and now issues the

¹ See Ringstedt, *Historik om Svenska Arkeologiska Samfundet. Utredning om verksamheten 1947–2001* (History of the Swedish Archaeological Society. Investigation of its activities 1947–2001). Published 2002, at the Society's homepage, www.arkeologiskasamfundet.nu; and "The Swedish Archaeological Society," *Current Swedish Archaeology* 11, 2003.

annual journal *Current Swedish Archaeology (CSA)*, containing articles reflecting current Swedish archaeological research and theoretical trends. There is also a newsletter, issued four times a year.

The Society's "Principles for good archaeological practice" note the public responsibility of the archaeologists with regard to the cultural heritage and the care of the cultural environment, in order to keep the ethical and scientific standard among the archaeologists in Sweden at a high level.

It might be appropriate to state here that – as far as I know – while there is widespread interest there is currently no regular education in Chinese or Asian archaeology in Swedish universities or other institutions. In Sweden, basic and postgraduate studies in archaeology, mainly North European prehistoric archaeology, take place at five universities (Stockholm, Lund, Uppsala, Gothenburg, and Umeå). In addition, basic education takes place at four colleges (Södertörn, Visby, Härnösand and Kalmar). At one university (Lund) medieval archaeology is taught, and at four universities (Stockholm, Uppsala, Gothenburg and Lund), Mediterranean and Near East archaeology. Responsibility for global postgraduate studies and contacts (e.g. with the Far East) currently rests mainly with the universities of Uppsala and Gothenburg. Osteology is taught at two universities (Stockholm and Lund) and at one college (Visby). Historical archaeology is planned at one college (Härnösand).

The archaeology of long-distance trade

Exchange and early contacts across ancient Eurasia will be discussed at this workshop. The archaeology of long-distance trade is a difficult and complex subject. The British archaeologist Colin Renfrew has stated that "trade cannot be assumed; it has to be proved."² However, this is problematic. Conveyance of resources and objects may occur for many reasons.³ Resources and objects could be distributed through trade – over long distances, by chains of exchange. Objects can be distributed through gift-exchange. Objects can also be brought home from travels, pillage, piracy, slave or hunting expeditions. Other explanations may be political, like tributes, taxes, treaties and of course by diffusion of ideas. One can well argue that archaeology cannot show how and in what way objects are imported or exported. Archaeology cannot completely reconstruct the virtual flow of resources and objects in ancient times, because much of what has been distributed has perished.

Is it possible to distinguish archaeologically between different causes for diffusion, in other words to find special criteria to prove diffusion by trade, by pillage, by gift exchange etc?

Personally I think that artifact diffusion might be a manifestation of trade when:

- a) there is a clearly identified proof of a large artifact transport originating from far away, found in a region in which contact and transport may have taken place without significant geographical barriers;

² Colin Renfrew, "Trade and Culture Process in European Prehistory," in *Problems in European Prehistory* (Edinburgh: Edinburgh University Press, 1979).

- b) weights and scales are found together with artifacts from faraway places;
- c) raw material or semi-manufactures from faraway places are found stored in regions without such resources;
- d) luxury goods (bronzes, glass, weapons) with a foreign origin are found dispersed in and around settled areas;
- e) there is a long distance between place of origin and the finding-place,
- f) objects of a rare type but without a specified function (for instance pieces of gold and silver) are found far away from their possible places of origin – in which case such pieces may be interpreted as means of payment,
- g) when finds of foreign pottery is interpreted as packing.

It seems, however, in the end not possible to prove with certainty, which of many explanations is the relevant one. I will conclude my introduction with two examples of special interest to this symposium.

Birka was the first Swedish town, existing during about 200 years, from ca 750 AD onwards. Among 2300 graves at the Birka cemeteries there are 111 chamber graves. There are 33 burials with silk fragments in chamber graves but altogether about 50 graves at Birka contained remains of silk. One silk sample only has been classified as of Chinese origin, and the rest as probably of Persian or Byzantine origin.⁴ The presence of silk in Birka graves can be attributed to various explanations. Trade is just one of them.

It may finally also be mentioned that on the nearby island of Helgö, there was in 1954 a sensational discovery of a small bronze figurine of a seated Buddha. It could have been brought there with a merchant, for the purpose of exchange – or just because the object was very exotic, and attractive to carry hanging around the neck (there was probably a leather thong used for that purpose).⁵

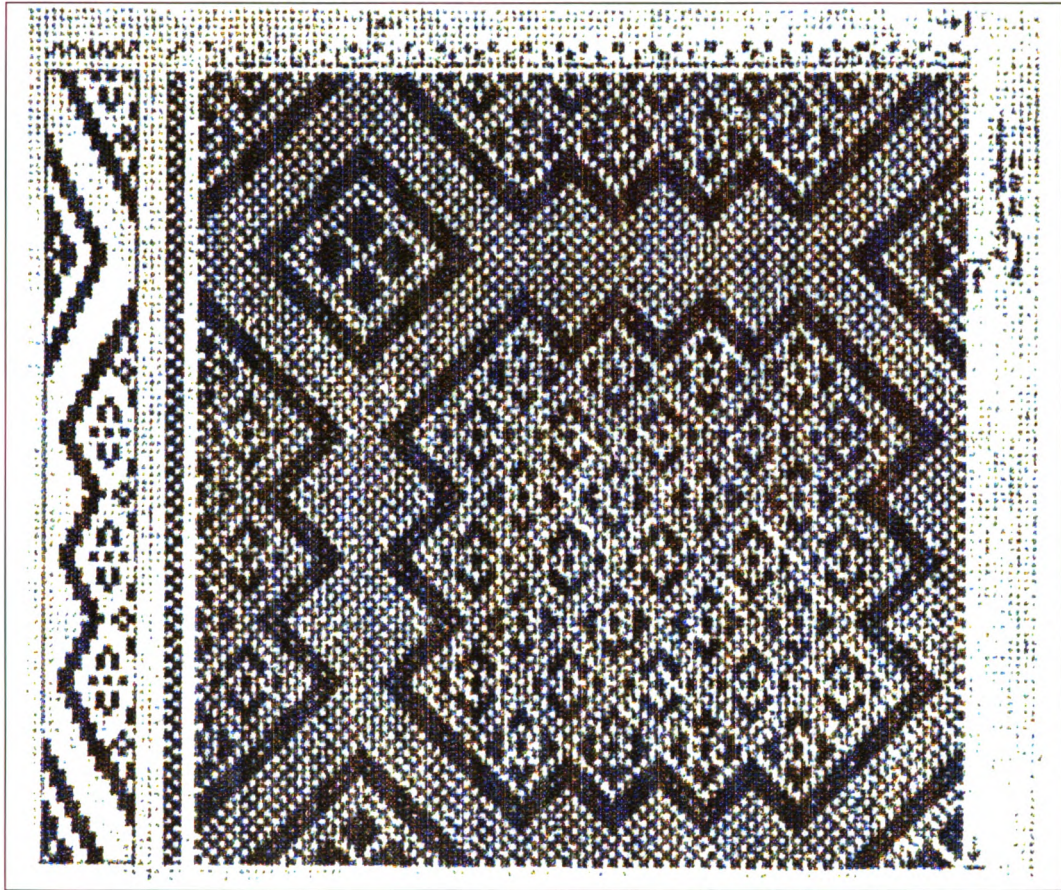
³ Ringstedt, "Artefact diffusion – exchange, trade and other explanations," in Göran Burenhult, et al, eds., *Theoretical Approaches to Artefacts, Settlement and Society. Studies in Honour of Mats P. Malmer*. BAR International Series 366 (ii), Oxford: BAR, 1987; *Varuutbyte och handel i arkeologiskt perspektiv. En forskningsanalys från konsumenternas synpunkt. Teoretisk del*. Arkeologiska rapporter och meddelanden från institutionen för arkeologi vid Stockholms universitet, 18, 1987; "Handel i ett ekonomiskt, arkeologiskt och historiskt perspektiv." In *Medeltidens födelse*. Symposier på Krapperrups Borg 1. Lund, Sweden, 1989; *Household Economy and Archaeology. Some aspects on theory and applications*. Stockholm University, 1992. Stockholm Studies in Archaeology 12.

⁴ Ringstedt, *The Birka Chamber-Graves. Economic and Social Aspects. An analysis based on quantitative methods*. Stockholm Archaeological Reports 32, 1997, with references; Agnes Geijer, *Ur textilkonstens historia*, 3rd ed. (Stockholm: Tiden, 1994), 71, see illustration.

⁵ On exotic objects, see also *Excavations at Helgö*, Vol.16: *Exotic and sacral finds from Helgö* (Stockholm: Kungl. Vitterhets Historie och Antikvitetsakademien [Royal Academy of arts and letters], 2004).

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Pattern on the piece of Chinese silk found at Birka in the Lake Mälaren, Central Sweden. After Agnes Geijer, *Ur textilkonstens historia* [From the history of textile art], 3rd ed. (Stockholm: Tiden, 1994), 71.

Forgotten Bridges: Dulinqiao and Shanqiao in Southern Hebei, China

by

Lucie Olivová

Introduction

Southern Hebei Province in Northern China is home to the famous Anjiqiao, the Anji 安濟 Bridge, a pride of old Chinese architecture. Built in stone in the early 7th century, it spans a relatively large space with its single, audacious segmental arch, and is decorated with fascinating dragon reliefs. A national monument, it now stands in a sterilized environment of a newly built park, admired by streams of visitors. Stupefied by its ingenuity, we tend to pass by less accomplished structures. This writing scrutinizes two such omitted objects, specifically, two stone bridges which rank below Anjiqiao both in terms of engineering and age. The fact that they have not been discussed except for the basic information offered in handbooks and dictionaries prompted my attempt to describe them and relate them to other bridges of southern Hebei. This report is intended to show that they are well worth our attention.¹

The older bridge, built in the year 1594, is called Dengyingqiao 登瀛橋, literally the "Bridge leading to Yingzhou 瀛州" (a place later known as Hejian 河間), but it is commonly referred to as Dulinqiao 杜林橋 (the Dulin Bridge). It crosses the Hutuo 滹沱 river in Dulin village, hence the designation. The village stands on the outskirts of Cangzhou 滄州,² but once belonged to Qingtian 青田 County. The second bridge,

¹ Initially, when visiting in 2000, the impressive proportions and beautifully carved decorations of Dulinqiao caught my attention. It turned out that there was no specific study dedicated to the Dulin Bridge, and to my knowledge, only three general studies about old bridges made mention of it: The voluminous book by Tang Huancheng (*Zhongguo gudai qiaoliang* [Old Chinese Bridges] [Beijing: Wenwu, 1987]), which has two short passages about its carvings (p. 126, 256) and seven photos (Nos. 142, 313 to 316, 321 and 322); Mao Yisheng, ed., *Zhongguo guqiao jishu shi* [History of the Construction Technique of Ancient Chinese Bridges] (Beijing: Beijing chubanshe, 1986), has a photo of the bridge as an example of an arch-bridge (picture 7.43), but no further description or comments; Peter Coyne ("The Artistry of China's Traditional Bridges," *Oriental Art* 36.2 [1990], 83-91), provides a photograph of one of the monkeys on a balustrade pillar). One year later, in 2001, I visited the Office for Cultural Relics in Cangzhou, whose Director, Ms. Wang Yufang 王玉芳, and her colleagues kindly provided me with documentation and also brought up the Shan family bridge in the neighbouring Xian county, six kilometers south of Xian County 獻縣 proper.

² Cangzhou is primarily known for the massive iron statue of a lion, made in the tenth century, which actually became the symbol of the county.

reminiscent of the former, stands in Xian County 獻縣 seventy kilometers west of Cangzhou, and it too crosses the Hutuo river. It is called Shanqiao 單橋 (Bridge of the Shan [Family]), and was completed forty-six years later, in 1640. Both bridges still fulfil their original function.

The Construction of the Dulin bridge

The Dulin Bridge is 66 meters long, 7 meters wide, and 7.8 meters high. The heavy structure is supported by three semicircular arches, each 5.25 meters high, spanning 18.5 meters, 17.4 meters and 17.4 meters respectively. Up in between the main supporting arches, two smaller arches are placed, each 3.75 meters high and 3.25 meters wide. The decking of the bridge is basically flat, with a mild elevation on both edges, where stone clusters, hidden by soil and vegetation, form a terrace, reportedly 29 meters wide.³ The stone blocks along the arches are fastened by iron tenons, which further secure the statics of the construction.

The dictionaries with entries on the Dulin Bridge claim that the idea underlying its construction was inspired by the early 7th century Anji Bridge at Zhaoxian 趙縣, about 250 kilometers west of Cangzhou. If so, then the ancient model may have been incorrectly described, or its technical mastery misunderstood. Anji Bridge, 50.8 meters long, employs a segmental arch which has a much longer span than a semicircular arch (see the drawing). In fact, one segmental arch of the Anji bridge alone spans fifty meters, whereas the Dulin Bridge needs three semicircular arches to bridge over 66 meters, and seems heavy by comparison. One could speculate that the builders in Dulin were not capable of constructing the segmental arch. Obviously, they lacked experience in this kind of building. Dulin Bridge, together with Shan Bridge, are the only bridges made of stone in the region, where that material is scarce. Stone had to be transported from the Taihang 太行 mountains on the western border of Hebei. The employment of semi-circular supporting arches rather links Dulin Bridge to northern Hebei bridges (see below), would it be not for the upper flow-arches.

The two flow-arches which penetrate the Dulin Bridge construction are set vertically, relatively high up above the thick piers. They at once lighten the weight of the whole construction, and permit the diversion of flood waters. This technical device was known a long time before, and is seen also on Anji Bridge. Once more, the technical superiority of the Anji Bridge is evident, this time from the manner in which the small flow-arches are placed. The Anji Bridge has one pair on each side of the main arch curve, placed as low as possible on the slanting edges of the segment, whereas the flow-arches of the Dulin bridge have horizontal bottom-lines, and penetrate the structure in a somewhat awkward height.

The balustrades which protect both sides of the decking are made of oblong stone slabs, separated by slim pillars, up to 1.75 meters tall and topped with small statues. The stone slabs are attached to the pillars from the side, but do not abut on the bridge decking. Supported in the middle by a block, they leave a narrow gap

³ *Hebei sheng, Cang xian zhi* (Beijing: Zhongguo heping, 1995), 489.

above the decking. This technical device also allows water to pass through when flooding occurs. The Anji Bridge has no such openings between the balustrade and the decking, but the nearby Yongtong 永通 Bridge, from the mid-8th century,⁴ a rather similar structure with one segmental arch and flanking flow-arches, has them.⁵ Therefore, this device too has been known long before the late 16th century, and the builders at Dulin may have adopted it from the Yongtong bridge or some other model.

Variant bridges

It may be of relevance that Anji bridge was repaired in 1597; the reparation of the Yongtong Bridge begun in the following autumn of 1598 and was finished in 1599.⁶ The late Ming period witnessed more building of stone bridges in southern Hebei, which followed the same engineering principle. (They are marked on the map, together with other selected examples). The segmental arch was achieved on the Fangshunqiao 方順橋, built southwest of Baoding 保定 in the Ming period, after 1556; and the Hongjiqiao 弘濟橋, built in 1582 at Dongqiaocun 東橋村 on the outskirts of Yongnian 永年 county.⁷ The Jimei 濟美 Bridge⁸ alternated segmental and semicircular arches. It was built in 1549 at Zhao xian, according to the inscription on its balustrade, and rebuilt in 1594, the very year when the Dulin bridge was completed.

Curiously enough, two bridges analogical to the Dulinqiao stand in Zhejiang, along the modern railway line from Hangzhou 杭州 to Ningbo 寧波. One of them, the Enbo 恩波 Bridge in Fuyang 富陽, south of Hangzhou, was originally a wooden structure, rebuilt in stone in 1565. It is 57 meters long, 6 meters wide; with three supporting semicircular arches — the central arch diameter is 18.4 meters, side arches diameters 15.3 meters each — and two small flow arches high up between them.⁹ (Another such bridge, Shaoxi qiao 苕溪橋 at Yuyao 余姚, west of Ningbo,¹⁰ can be seen on the drawing accompanying this article.¹¹)

⁴ Previously, Yongtongqiao had been considered a late 12th century construction from the Jin 晉 dynasty. According to archeological findings from 1968, namely an inscription carved into a slab, the dating was corrected to the years 765-66. See *Hebei sheng wenwu baohu danwei tonglan*, 21.

⁵ Old segmental bridges with flanking flow-arches were also built in Shanxi, eg. Jingdeqiao 景德橋 at Jincheng 晉城, completed in 1191, damaged in 1472, and rebuilt in 1736, with carvings, which is 30 meters long; its segmental arch spanning 21 meters. Mao Yisheng, *Zhongguo guqiao jishu shi*, 86, plate 3-12, also *Zhongguo mingsheng cidian*, p. 113, with a photograph.

⁶ *Liang Sicheng wenji*, (Beijing: Zhongguo jianzhu gongye, 1982), vol. 1, 246.

⁷ *Hebei sheng wenwu baohu danwei tonglan*, p. 164 and 266 respectively. See also *Zhongguo mingsheng cidian*, p. 83.

⁸ The Jimei bridge was torn down in winter 1966. A description by Liang Sicheng, numbering some 300 characters, from 1932, is incorporated in his article "Zhao xian dashiqiao ji Anji qiao 趙縣大石既安濟橋," *Liang Sicheng wenji*, vol. 1, 253.

⁹ Mao Yisheng reproduces its black and white photograph 3-51, basic data are in *Zhongguo mingsheng cidian*, 289. See also Mao Yisheng, *Zhongguo guqiao jishu shi*, 84; and Tang Huancheng, *Zhongguo gudai qiaoliang*, 126.

¹⁰ Xiao Mo, ed., *Zhongguo jianzhu yishu* [The Art of Chinese Architecture] (Beijing: Wenwu, 1999), vol. 2, 808 and 809. The text comments that the bridge is "relatively big."

¹¹ Since I know no more about them at this stage, I cannot judge their significance in relation to the southern Hebei bridges.

In spite of the technical shrewdness and the undeniable grace of the bridges with small flow-arches, the construction is not widely spread. In the rest of northern China, stone arch-bridges usually have not been constructed with the upper small flow-arches. The common type of arch-bridge has multiple semicircular arches built on thick piers, and is often quite long. The flat decking is convenient for road transportation. Of this type, the Marco Polo Bridge at Lugou 盧溝, first constructed in the late 12th century,¹² is a well known example; less known, but not too distant from it, is the Yongjiqiao 永濟橋 at Zhuozhou 涿州, also built during the Wanli 萬曆 reign (1573–1620). It has nine arches and is 118 meters long. In fact, it is the longest historic bridge in Hebei province.¹³ In the town of Hengshui 衡水, there stands another such bridge, called Anjiqiao 安濟橋 (not to be confused with the Anjiqiao at Zhaoxian).¹⁴ Finally, the magnificent Wurenqiao 伍仁橋,¹⁵ twelve kilometers south of Anguoshi 安國市, can be considered an elegant rendering of this type. Almost sixty meters long, it rests on five circular arches, which increase and decrease in size (8, 9, 10, 9, 8 meters in diameter), causing the decking to slightly curve, in a most appealing manner. This bridge is also embellished with many carvings. It was ordered by the imperial concubine Zheng 鄭妃, and built in 1598–1600. We may therefore assume that the builders previously took part in imperial constructions in the capital. This would explain the distinct, and elegant appearance of this bridge.

If one likens the above mentioned bridges in northern China to their much admired counter-parts in Jiangnan 江南, the obvious difference lies in the form of the decking. In Jiangnan where water transportation prevails, bridges mostly have only one arch, high enough to let loaded vessels pass. The decking rises high and falls along the curvature of the arch, and is paved with steps. The pillars are thin, since the soil is soft and unstable. The Jiangnan type is quite picturesque and was taken over by garden architecture. The aesthetic appreciation is inspired by the silhouette of the whole construction, and does not depend on the presence of ornamental details. By comparison with the North, it seems that most southern bridges only make a restrained use of ornamentation.

The sculptural decoration of the Dulin bridge

It has already been stated that the sculpture on the Dulin Bridge is abundant and striking. Sitting by the east entrance to the bridge are two lions. On the outer walls, above the highest point of the arches, are masks of water dragons (in the written documentation indicated as *baxia* 叭夏),¹⁶ viewed from the front, or figures of dogs, viewed in profile. The balustrade, too, is richly carved. On the top of most balustrade pillars are statues of lions, monkeys, miniature Buddhist shrines, and a *qilin* 麒麟. The

¹² The original bridge from 1198, reconstructed 1444, was swept by flooding during the Kangxi reign, and rebuilt in 1698. *Zhongguo mingsheng cidian*, 31.

¹³ *Hebei sheng wenwu baohu danwei tonglan*, 175–76.

¹⁴ Originally built on three arches in 1553. The current construction dates from 1765. *Hebei sheng wenwu baohu danwei tonglan*, 218.

¹⁵ *Hebei sheng wenwu baohu danwei tonglan*, 174; *Zhongguo mingsheng cidian*, 87.

¹⁶ In the original, the character *xia* is also written with a mouth radical.

statues are 40 to 50 centimeters high, in average. The oblong slabs of the balustrade have regular size, and are carved with reliefs both inside and outside. They are forty-six in total: fifteen slabs on each side of the bridge along its levelled central part, and sixteen slabs (four on each corner) set into the slanting part of the balustrades, partly sunk into the ground. The outer slabs are carved with floral motifs. From the inner side, at least ten slabs were severely damaged during the Cultural Revolution, three of them completely erased. Also some of the statues, notably a stone monkey, lost their heads. The subjects of the 37 slabs that remain intact or were partly damaged are, in order of frequency: Figural scenes, including Buddhist scenes; herons and lotuses; phoenixes; dragons; the four deer; symbolic plants, ie. the *lingzhi* 靈芝 fungus or the “three friends of winter;” landscapes; and the eight steeds — this last motif occurring once only. Most fascinating are the figural scenes, some of them with captions suggesting speech, thoughts or dreams, reminding one of Ming book illustrations. Almost half of the scenes depicted are coupled with the same or a very similar motif carved onto the slab on the opposite side of the bridge.

The monkey, sitting in a natural posture atop the balustrade pillars, is featured as a prominent sculptural motif of this bridge. This is intriguing, since the monkey is not common in Chinese architectural decoration, when compared with the four miraculous creatures (*si ling* 四靈: lion, phoenix, turtle and *qilin*) and other auspicious symbols of longevity (such as the crane, or the deer), wealth (the horse, or fish), happiness (the bat, for the homonymy of the word for bat, *fu* 蝠, with the word for happiness, *fu* 福), or the four cardinal points (as represented by the dragon, tiger, bird and the turtle, respectively), and so forth. In the same vein, the monkey — sometimes riding a horse — symbolizes career promotion, or a successful official career, *hou* [monkey] being a homonym for a ranked official. One can identify a monkey in the ornamentation of a house as an expression of the wish for gaining a high position, and it stands to reason that bridges, built with contributions by local officials, would be carved with symbols expressing the hope for such advancement.¹⁷ Speaking of other bridges in the region, monkeys can be also seen on the Shan family bridge (described below), which copies the Dulin Bridge in many ways, and on the Hongji bridge, built in 1582 in Yongnian County. The Hongji Bridge, 48.9 meters long, is carried by a segmental arch, flanked by a couple of small flow-arches from both sides, very much like the ancient Anji Bridge. Eighteen balustrade pillars, approximately half of the total, are topped with lions, monkeys, *qilin* etc. Animals, peaches, pomegranates and representations of tales such as “Wu Song 武松 kills the tiger” are carved in relief on balustrade slabs.¹⁸ In the neighbouring Shanxi province, the Tonghui 通惠 Bridge has monkeys and rabbits seated or perhaps lying on all four legs, atop the capitals of balustrade pillars;¹⁹ and the bridge by the Huoxian 霍縣

¹⁷ I am grateful to Professor Ronald Knapp for discussing this question with me.

¹⁸ *Hebei sheng wenwu baohu danwei tonglan*, 266, provides a brief description, and a photograph. *Zhongguo mingsheng cidian* has more information, on p. 83. I have not visited this bridge.

¹⁹ Mao Yisheng, *Zhongguo guqiao jishu shi*, plates 7.43 and 7.44.

²⁰ Liang Sicheng, „Jin Fen gu jianzhu yucha jilue,” in *Liang Sicheng wenji*, vol. 1, 324.

county town's northern gate has one out of several balustrade pillars carved into a monkey.²⁰

There may have been a specific reason for topping the pillars of the Dulin Bridge with monkeys, beside the usual lions, but if so, it is long forgotten. An investigation into the motifs used by embroidery, paper-cuts and other folk art could possibly tell us more. The monkey king Sun Wukong 孫悟空 of the popular vernacular cycle comes to mind, yet there is nothing to prove or even suggest a connection between him and the very realistic statues decorating the Dulin bridge; and none of the slabs is carved with subject matter from the famous work relating his story, the *Journey to the West*. Local people, when asked, simply suggest that the monkey is a very cute animal. One pointed out that there is a folk song grouping together lions, monkeys, and flood-water dragons, which goes: "Three thousand lions, six hundred monkeys, twenty-seven dragons (*sanqian shizi, liubai hou, qishi'er tong jiaolong* 三千獅子六百猴七十二蛟龍) ...," and so on.²¹

Furthermore, it ought to be mentioned that there is a water spirit whose appearance is that of a monkey, called Wuzhiqi 巫支祁.²² His cult is documented for the area around the junction of the Huai 淮 and Guo 渦 rivers in northern Anhui. The legend about Wuzhiqi says, basically, that the spirit, which is a giant monkey with a black body and a white head, was dragged out of the river by a chain to which he was attached, but then ran away, in one version of the story. In another version, he was captured under the Turtle Mountain, and since then the waters of the river have been subdued. Wuzhiqi's physical form seems to be related to the ancient spirit of mountains and rivers called *wangliang* 罔兩 who, according to *Huainan zi* 淮南子, had a reddish black colour, and resembled a three year old child.²³ The notion of Wuzhiqi as a monkey is explicit in Tang writings, and a Song period bronze statue of a monkey-like creature, kept in the Museum für Ostasiatische Kunst in Berlin, can also be identified with Wuzhiqi.

On the whole, however, water deities do not take the form of a monkey, and the Qing edition of the Xuyi County gazetteer,²⁴ for example, makes no mention of what Wuzhiqi looked like; the current belief being that he appears as a dragon or a turtle. For that reason, and also because of the relative distance between Hebei and Anhui, it is problematic to connect Wuzhiqi with the monkeys on the balustrade of the Dulin Bridge.

Last but not least, the monkey symbolizes a zodiacal sign. The Dulin bridge was completed in the year 1594, *jiawu* 甲午 in the traditional dating, i.e. a year of the

²¹ Interestingly, the monkey appears as a prominent art motif among the materials recovered from the tomb of the Zhongshan 中山 king, on permanent display in Hebei Provincial Museum at Shijiazhuang 石家莊. These objects are also from southern Hebei, but date from a far earlier period (327-313 BC). One notes, however, for example, the Lamp Held by a Servant, which sits atop a long pole, on which a monkey, followed by a dragon, is climbing. Also, on the Coin Tree with Fifteen Branches, one finds five monkeys, two birds, and one dragon.

²² This spirit is scrutinized by Poul Andersen in his recent book, *The Demon Chained Under Turtle Mountain. The History and Mythology of the Chinese River Spirit Wuzhiqi* (Berlin: G + H Verlag, and the Author, 2001).

²³ From Japan, a kindred spirit 'something half way between a child and a monkey' is known, named *kappa* 河童, said to have lured horses into the water.

²⁴ The *Xuyi xianzhi gao* cited by Andersen, 47.

horse. The preceding year *wushen* 戊申 corresponded to the monkey-sign. Assuming that a stone bridge of such size was not built within a single year, the work may have already started the year before. The work was also affected and slowed down by seasonal changes. First, if the stone from Taihang mountains was moved on ice, as is recorded in the case of Anji Bridge, it must have been moved only during winter. Second, the pier foundation was constructed in late summer, when the Hutuo river regularly dries up, creating optimal conditions for such an undertaking. Hence the idea that the statues of monkey may have also been inspired by the sign of the year 1593 seems plausible. However, it does not explain the presence of monkeys on the other bridges.

The history of the Dulin bridge

How is it possible that the beautiful, solid stone bridge sprang, as it might seem today, practically out of nowhere, in Dulin? The history of the bridge has been recorded on two steles, dated respectively 1594 and 1907. Both texts have been damaged and are partly fragmental, yet the overall sense is clear enough. From the text of the older stele, composed by Ruan Shangbin 阮尚賓, we learn that in the village of Dulin, on the route between Cangzhou and Hejian, there used to be a ford across the Hutuo river. However, when rains caused the water level to rise, the ford could be crossed only with great difficulty, and certainly not by carriages. Eventually, boats were employed, but not enough to carry all those who wanted to cross the river. Then the official Ruan Shangbin, the author of the text, seeing the complicated traffic situation at the ford, decided to perform a meritorious deed and to build a bridge:

The building of Dengyingqiao bridge, as recorded by Ruan Shangbin, the salt distribution commissioner of Changlu 長蘆:

Changlu lies on the bank of the river Wei 衛. This river flows north towards Tianjin 天津, and westward directly to Hejian county. It comes and goes via this route; and overflows with waters. Beyond Dulin its waves become disorderly and roll. As years went by, [the situation] worsened. When rain came suddenly, and blocked [the riverbed] with silt and mud, one had to proceed by foot, since horse-drawn carriages turned over and were halted. Furthermore, rapidly flowing objects injured people. For a long time, this had been unavoidable. Some years ago, local people started dispatching boats to drive passengers across, but they were too many, [the ford was] crowded and this was not enough. A change was needed, but there never has been a magnanimous official who would reduce his own property, take over command, gather workers, provide material, and order Taoist monks to collect contributions. Then I arrived and gladly said, 'This would be a propitious and beneficial deed.' I cut my salary to assist the accomplishment of the construction. Thick layers of earth were piled up to sustain [the construction]. The supporting pillars are large, not to be encircled by outstretched arms. Truly solid. If rushing and flowing waters roll over this flat land again, they would cause no more damage. The bridge is protected by a mound from the east. The bridge has five arches, which let the flow pass unhampered.

From then on, [the journey on] the imperial road has not irritated the people, and they do not moan in distress. In a twinkling of eye, they can reach [the other bank]. Oh, rejoice, loaded roaders! Were there ever again the ford, would

[I] not pay twenty thousand for a certain profit? Besides, ten millions were donated. Opinions are not united: The works took long and were demanding; toll collectors are not happy to have lost the ford. The merit has not come easily. So has been recorded.²⁵

An accompanying stele from the year 1594 lists the names of sponsors.²⁶ At the head are the names of Ruan Shangbin and Hu Lian 胡璉, the current Cangzhou magistrate, followed by some twenty six officials from various places in China, and twenty eight local men.

The text of the stele from 1907, composed by Wang Yingtong 王蔭桐, briefly recapitulates the building effort of 1594, but further states that the reason for it was not only to facilitate the crossing of the river, but specifically 'to make the transport of salt easier.' Ruan Shangbin actually held the office of the salt commissioner, a fact that the first stele omits. The information about the salt transport probably is the answer to the question posed above. The road between Cangzhou and Hejian was one section of the Imperial road from Nanjing 南京 to Beijing 北京, along which salt, amongst other goods, was being transported. The production and distribution of salt was an important state monopoly, and facilitating this industry was a task of imperial dimensions, reflected in those of the bridge. Wang Yingtong's stele supplements another information, according to which the initiator of the building was a local commoner Liu Shangyong 劉尚用. It was precisely he who also raised capital for the building of Shanqiao a few decades later.

The stele from 1907 also records the subsequent history of the Dulin bridge. In the eighth month of 1894, heavy floods broke two arches, large and small, by the west abutment. Because of financial difficulties and problems with procuring stone, the reconstruction was delayed for thirteen years – until 1907. The main contribution towards it came from the official Wang Yintong, who spent an enormous sum and fell in debts as a result. The text says:

The former name of Dulin was Dengying zhen 鎮. It lies on the river Hu[tuo], and it never had a bridge, not until the *jiawu* year of Wanli (1594). Behind its building was the benefactor Liu Shangyong who personally witnessed the difficulties at the ford. A stone bridge was built in order to ease the journey and get optimal profit from the transport of salt; Ruan Shangbin, the salt commissioner, and Liu Yukuan 劉毓寬, the prefect of Ying 瀛, contributed and helped to create it. Also gentry and merchants from the neighbouring places made contributions to its completion. For three hundred years, the road has been levelled, travellers are satisfied and have no complaints.

At the end of autumn of the *jiawu* year (1894) came extraordinary floods. As a result, on the last night of the eighth month, two arches on the west end sunk, one big and one small. People had good intentions and thought of repairing it, but a lot of work was to be done, there was a shortage of means, and so they were afraid of difficulties. The process was halted temporarily. It was distressing... Where would the stone come from? Do not brag! This region does not produce stone, and people do not know how to work it. Ten thousand difficulties were

²⁵ The text of the stele was copied by the curators of Cangzhou's cultural relics office, but far too many characters were not clear, and left blank; a text was transcribed in full in the local gazetteer, published in 1931. (*Hebei sheng, Qing xian zhi*, p. 164.) Some characters differ in the two versions, probably as a result of erraneous reading. My translation of the text is based on both versions.

²⁶ The text is transcribed in the documentation at Cangzhou wenwu chu.

reconsidered. ... The reconstruction lingered, and was delayed fourteen years, until the year *dingwei* 丁未 (1907).²⁷

Wang Yingtong not only wrote the text of this stele, but also composed three poems about the difficulties accompanying the reconstruction, and had them carved on yet another stele, also from the year 1907.

As for the recent history of the bridge,²⁸ it was adapted for motor vehicles in 1913. This meant that the decking was newly paved, and flattened. In 1957, the bridges underwent repairs. During the Cultural Revolution, the bridge was vandalized, carvings and steles were damaged, at times seriously, and the stele with the historic record from 1907 was smashed into two pieces. After the Cultural Revolution, in 1976, the bridge was inspected by specialists, and again in 1982, when, on the 23rd of July, the Hebei government proclaimed Dulin (Dengying) Bridge an "Important cultural monument of the provincial level" (i.e. *shengji zhongdian wenwu* 省級重點文物). The official documentation from the Office of Cultural Relics was completed in 1986; the bridge was again repaired in 1995–96.

The Shan Family Bridge

Given its similar shape and embellishment of the superstructure, one would not hesitate to say that the Shan Family Bridge, the Shanqiao, was copying the Dulin Bridge, when its construction began thirty-five years later. The notable difference is in its size. Shanqiao is larger: 75.5 meters long, 9.5 meters wide, and 8 meters high.²⁹ It has five semicircular arches, each 9.9 meters in diameter (the main arches of Dulin bridge are only three, but bigger: 11.3 meters in diameter). In the area between the main arches and the levelled decking, there are four smaller flow-arches, in the shape of vaulted opening with flat bottom, like on the Dulin Bridge.

The building history of Shanqiao is longer and more complicated, however. By the mid-15th century, there stood a wooden structure called Shanjiaqiao 單家橋 (Shan Family Bridge) which was repaired during the reign of Hongzhi 弘治 (1488–1505), and again shortly afterwards, in 1511, when it was renamed Wujieqiao 五節橋 (Bridge of the Five Virtues).³⁰ In 1629, the Hejian Magistrate, Wang Fengyuan 王逢元, suggested rebuilding it in stone. From then on, three villagers tried to raise money, among them the same Liu Shangyong who had sponsored the building of Dulin bridge thirty five years before. The names of the contributors are recorded on six stone slabs set to the southern side of the bridge. They were many, but apparently their contributions were small, since the fund raising proceeded but slowly, and the stone bridge was not completed until eleven years later, in 1640. In the 19th century,

²⁷ *Hebei sheng, Qing xian zhi*, p. 165.

²⁸ From the hand-written documentation of Cangzhou wenwu chu.

²⁹ These measures are given by the Xianxian wenwu guanli suo, as well as *Hebei sheng wenwu baohu danwei tonglan*, p. 204. However *Zhongguo mingsheng cidian*, 97, length 69 meters, width 6.9 meters, diameter of the main arches 9.8 meters.

³⁰ Or, of the Five Virtuous Ladies. According to *Zhongguo mingsheng cidian*, 97, the place was raided by soldiers in that year, and five women committed suicide by throwing themselves off the bridge.

Shan family bridge was repaired. At this time, due to the Taiping 太平 rebellion, the stone from Taihang mountains was not available, and an inferior sort of stone had to be used instead. The difference in the quality of material is visible on the southern edge of the bridge. More recently, in 1957, the bridge was inspected by an official named Li Bin 李彬. The Shan Family Bridge also suffered in the years of the Cultural Revolution, when the stone carvings were vandalized and the steles and their turtle-shaped stands broken. In 1980–81, the steles were repaired and re-erected in a row on the northern bank of Hutuo River. Shanqiao was proclaimed a provincial level cultural monument on the 23rd July 1982, the same day as the Dulin Bridge. In 1986, the official documentation was completed, and archived at the Local administration of cultural relics at Xian county.

Shanqiao is quite reminiscent of its model, the Dulin Bridge, but it is not identical. The shape of the balustrades was further developed: They turn out along the bank, creating the character *ba* 八 (eight), a symbolic guarantee of wealth. On the northern bank, both the prolonged balustrades display three pictorial slabs, and in front of them, a pair of lions guard the bridge. On the southern bank, the diagonally set balustrades fall rapidly to the ground. In front of them, an equestrian statue guards the bridge by the sides of the road, facing south (outwards). Both statues were severely damaged: the riders cut off at the waist, reportedly during the Cultural Revolution. The Shan family bridge is also richly decorated with relief carvings. On its outer side, above the apex of each arch, is a mask of dragon *baxia* who “swallow heaven and spit out sea (*tun tian tu hai* 鯢天吐海),” nine masks in all. The balustrade is interspersed with slim pillars, their capitals topped by statues of lions, monkeys, shrine and one *qilin* 麒麟. The stone slabs set in between the pillars are carved from both sides. On the bridge, there are fifty-four slabs (two times twenty-seven) of uneven width, and six more slabs (two times three) on the balustrades which turn out diagonally along the northern bank, as already mentioned.³¹ The subject-matter of the carvings seem to lack any unifying concept, and they are much more varied than in the case of Dulin bridge, last but not least because they never form topical pairs. The subjects of almost all carvings were identified in the documentation for Shanqiao:³² They illustrate legends; tales from the Classic of Filial Devotion (*Xiao jing* 孝經); folk tales; tales from the realm of literature and history, or they depict mythical beasts, in fact just anything seems to have been chosen that was popular and pleasing to the local people. Some of the carvings differ in styles of execution. In addition, customary motifs, eg. lotuses, are depicted in various ways, some of them new and distinct iconographically. This suggests that several sculptors were employed over the time, using different manuals and sometimes unconventional ideas. The present-day guide to historical monuments and sites, the *Zhongguo mingsheng cidian*, regards Shanqiao as “the most decorated bridge in Hebei.”³³

³¹ That makes sixty slabs, according to my counting. *Hebei sheng wenwu baohu danwei tonglan* gives the total sixty two, and *Zhongguo mingsheng cidian* gives seventy.

³² On the other hand, the documentation for Dulinqiao does not specify its pictorial slabs one by one, and when I mentioned this to the curator, it turned out that the topics of many slabs have not been determined.

³³ *Zhongguo mingsheng cidian*, 204.

The overall style of the sculptures of the two respective bridges shows differences. The Dulin Bridge was built in order to ease the transportation along the Imperial road, and the sculptors were skilful artisans, perhaps connected to some metropolitan workshops. They were not, however, constrained by any metropolitan conventions. The Ming carvings we know from imperial palaces and temples in Beijing have unified style and limited subject-matter, such as ornamental sets of auspicious signs: the eight lucky symbols, the eight Buddhist treasures, etc. On the Dulin Bridge, on the other hand, free imagination gave rise to a wide variety of topics, mundane, auspicious, Buddhist, many not related to water spirits and the specific protective symbolism one would expect in bridge decoration. It is possible to see similarities between the freedom and invention shown by the bridge sculptors, and the books illustrations or the painted porcelains that flourished during the same period. This tendency, together with a notable diversity of styles, is even more valid of the Shan family bridge. However, the carvings of Shanqiao, when compared to the professional execution of the carvings of Dulinqiao, seem somewhat coarse: the stone is less polished, and the overall impression is that of rusticity. The differences between the carvings on the two bridges may reflect the cultural orientation of their sponsors: educated officials in the case of the more elegant Dulinqiao reliefs, commoners in the case of the more rustic Shanqiao reliefs. It is a matter of taste as to which are nicer, but the Chinese curators definitely preferred the more varied, and less damaged Shanqiao carvings.

Bridge carvings

Chinese writings about bridges usually pay attention to the architecture and, as if the technical aspects distracted the authors from art historical interests, merely mention the ornamentation. The habitual examples of bridge ornaments, repeated by most authors, are the lions on the balustrade of Marco Polo bridge at Lugou, and the large dragon repeated on the inner side of the balustrade slabs of Anjiqiao. Of the materials available, only the book about historic bridges by Tang Huancheng contains a full chapter on bridge decorations. There also is a relevant pioneer study about balustrades, written in 1935 by Liang Sicheng, where a number of bridge balustrades appear among the illustrations.³⁴ One may observe a significant rise of interest toward architectural decoration at present, judging by the topics presented in the journal *Gujian yuanlin jishu* 古建園林技術 over the past years, or the chapters on decoration in the second volume of *Zhongguo jianzhu yishu* from 1999, yet there still remains much worth further investigation.

Stone bridges often had sculptural adornment. Generally, southern bridges possessed beautiful shape, whereas bridges in northern China were carved. Even so, common traffic bridges (not the decorative bridges in palace complexes and gardens we tend to be more familiar with today) usually only displayed a few single carvings, the theme and form of which could have been repetitive. On the abutment, a pair

³⁴ The article was republished in his *Zhongguo jianzhu yishu tuji* (Tianjin: Baihua wenyi, 1999), as well as in *Liang Sicheng wenji*, vol. 2, 243-73. See the References.

of lions or elephants, a pagoda, ornamental columns (*huabiao* 華表) etc., placed on either end, protected and at the same time decorated the bridge. On the sheer walls, the mask of a mythical water dragon without horns (*chi* 螭, also called *xishui shou* 襲水獸) – a creature who bolts water, and therefore protects against floodwaters, or the protruding head of a river spirit (*shuishen* 水神) in human shape³⁵ looked out above the highest point of the central arch, near the abutment, or above several arches. The water dragons were carved on countless Chinese bridges; the ‘human’ heads of river spirits were less prominent. They were carved, for example, on the 8th century Yongtong, and the 16th century Jimei bridges, both in Zhaoxian. In many cases, the relief carving of a protective deity on the outer walls may seem scanty, considering the size of the body of the bridge.

As for the balustrade ornamentation, carved capitals of the pillars between the slabs were common, carved slabs less so; they were left plain in many cases. If decorated, then with restraint, repeating floral or cloud patterns (for example, on Wurenqiao), or carving only some of the slabs (for example, on Anjiqiao and Yongtongqiao). Pillar-capitals were usually carved into stylized conic shapes, or in some cases into the figures of lions. Small lions on the capitals are best associated with the Marco Polo bridge, but more bridges have them, eg. Fangshunqiao has 22 pillars with lions; Wurenqiao has 26 pillars with lions; and Anjiqiao (at the city of Hengshui) has 60 pillars with lions.³⁶ Bridges adorned with statues of small lions were much admired for their beauty; the decorative aspect obviously took over the protective role. Yet they hardly provide the degree of richness and variety sprouting from the sculptural works on Dulinqiao and Shanqiao, which I inspected on site, or Jimeiqiao³⁷ and Hongjiqiao, which I could only read about. Carvings on these and perhaps still other bridges, are simply too many and too playful; their obvious role is to decorate. That such traffic bridges, with plentiful and varied carvings on the walls, the balustrade pillars and the balustrade slabs as well, were rather unusual, was likewise the estimate by Liang Sicheng.³⁸

Some of the most catching balustrade reliefs on the Dulin and Shan bridges were composed of whole sets of scenes, each of them relatively small in scope. Similar slabs, beautifully carved with elephant, mountains etc. are on the outer side of the Yongtong bridge balustrade — these carvings were executed in 1507.³⁹ They are indeed reminiscent of book illustrations, especially the vivid narrative and figural scenes. Other slabs on Dulinqiao and Shanqiao depict animals, flowers or mountains. Such reliefs did not commonly occur on bridges, although these bridges had them. They are rather more often found on stone archways (*shifang* 石坊) which, like

³⁵ Zhou Xing, *Jingjie he xiangzheng: Qiao he minsu* [The Realm and the Symbol: Bridges and Folklore] (Shanghai: Shanghai wenyi, 1998), 254.

³⁶ *Hebei sheng wenwu baohu danwei tonglan*, p. 164, 174, and 218, respectively.

³⁷ According to Tang Huancheng, *Zhongguo gudai qiaoliang*, p. 126, the balustrades on Dulin and Jimei bridges were quite alike. Tang Huancheng does not mention Shan qiao.

³⁸ Having inspected the arch bridge outside the Northern gate of Huoxian, in Shanxi, Liang Sicheng noted that the balustrade slabs were not only carved on both facets with floral and figural motifs, but also the pillars between them were strikingly embellished; they were quite tall and had capitals carved into round shapes of balls, vases, blossoms, calabash and the like. He finally pointed out how exceptional such decorations were. See *Liang Sicheng wenji*, vol. 1, p. 294; 324. However, North gate bridge in Huo xian had plain outer walls.

³⁹ *Hebei sheng wenwu baohu danwei tonglan*, 21.

balustrades, were originally made of wood. One should remember, however, that the stone archways embellished with carved slabs usually date from later periods than from the Ming. A rare contemporary example is the so-called "Throughout-Carved Archway" (*toudiao shipailou* 透雕石牌樓), 12.1 meters high, in Lingshouxian 靈壽縣 north of Shijiazhuang, Hebei Province, erected in 1641.⁴⁰ Other contemporary Ming period archways may sometimes have curious and decorative silhouettes, but their reliefs, if any, represent big scale dragons: A single one, or two contending for a pearl. Minute and plentiful scenes on stone archways, similar to those I was discussing, did not push through until the early Qing period, e.g., the massive archway covered with narrative scenes, by the entrance to Guandi 關帝 temple at his birthplace Xiezhou 解州, Shanxi province; or the archway in front of Dai miao 岱廟 temple in Tai'an 泰安, Shandong province, dating from 1672, decorated with floral and geometric motifs. During the first half of the 19th century, the commemorative archways with minute reliefs abound, and many magnificent examples are preserved. Still later, the appeal of this kind of decoration did not cede, judging from the often reproduced, although outdated White Archway at Longquan 龍泉 temple in Wutai 五台, Shanxi province, which dates from 1926. By that time, however, building, including bridge building, adopted new techniques, using different materials, and the massive stone construction became a part of history.

Concluding remarks

Given their four centuries of age, their monumental size, their distinct type of construction and their exuberant decorative sculpture, Dulinqiao and the echoing Shanqiao do not deserve to be forgotten. Viewed technically, they represent a particular type of stone bridge, with flat decking atop three or more semicircular arches, and with smaller flow-arches set above each pier. The type was nonetheless not limited to this area; there are at least two more examples in Zhejiang Province further to the south. This construction may be classified as a relatively distant modification of the ancient arch-bridges at Zhaoxian — for unclear reasons, the late Ming period builders employed arches of a semicircular shape, and increased, by necessity, their number to three arches (as seen at Dulin) or five arches (as seen at Xianxian). They also increased the size of the construction, which ultimately far exceeds the average northern Chinese arch-bridges with small flow-arches.

Finally, the rich sculptural ornamentation of Dulinqiao and Shanqiao, by its sheer quantity and quality, makes them singular. The slab reliefs open possibilities for research on sculpture, folk art and the like, as the narrative pictures are comparable to printed illustrations of the period. In this respect, the two surpass other northern Chinese stone bridges.

⁴⁰ *Zhongguo mingsheng cidian*, 81.

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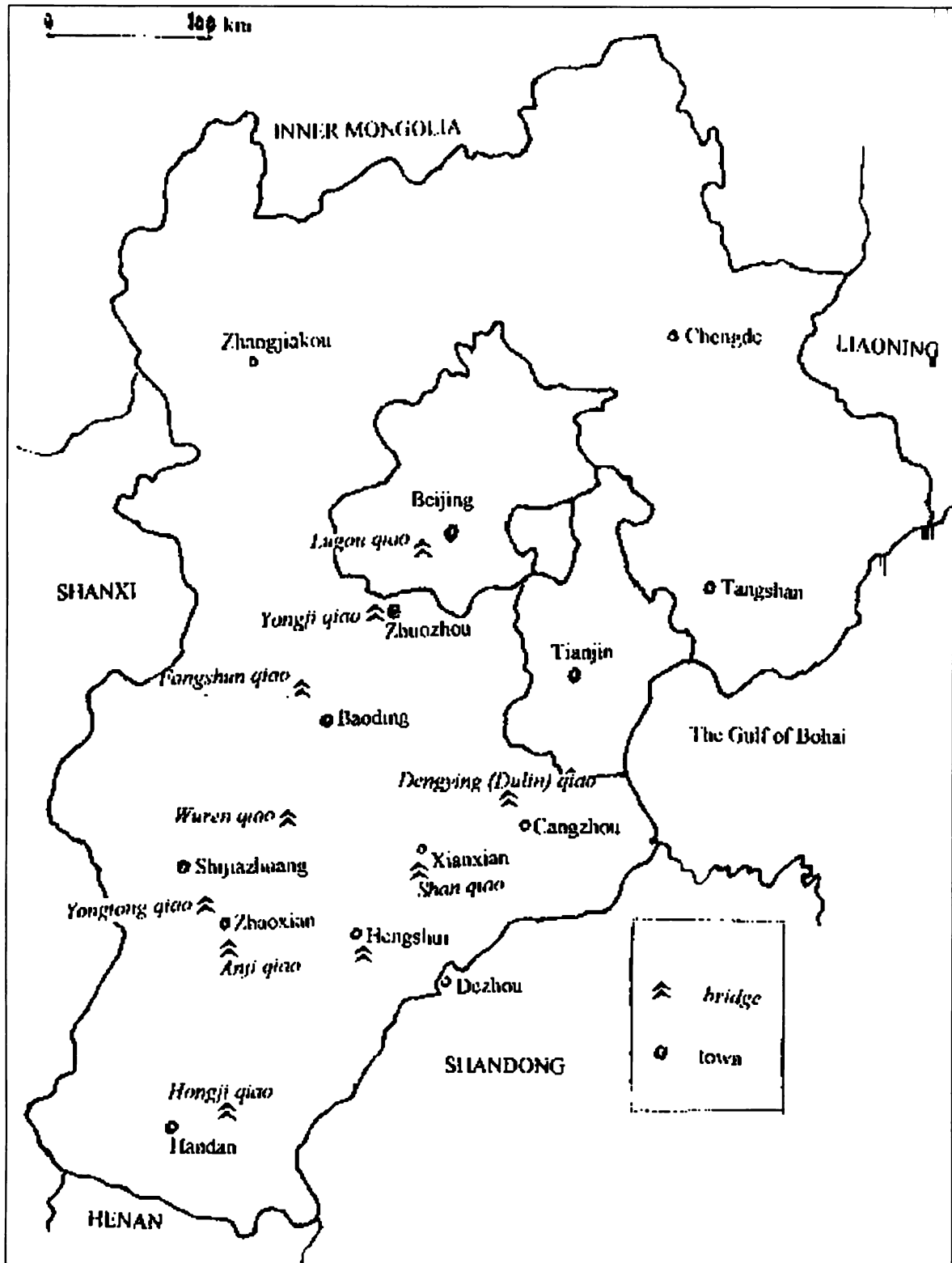


Figure 1.
Map of old bridges in Hebei.

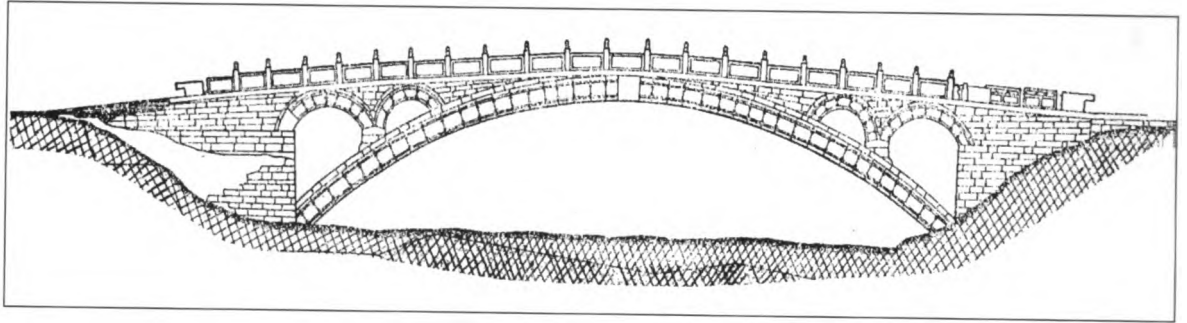


Figure 2.
Anjiqiao, at Zhaoxian.

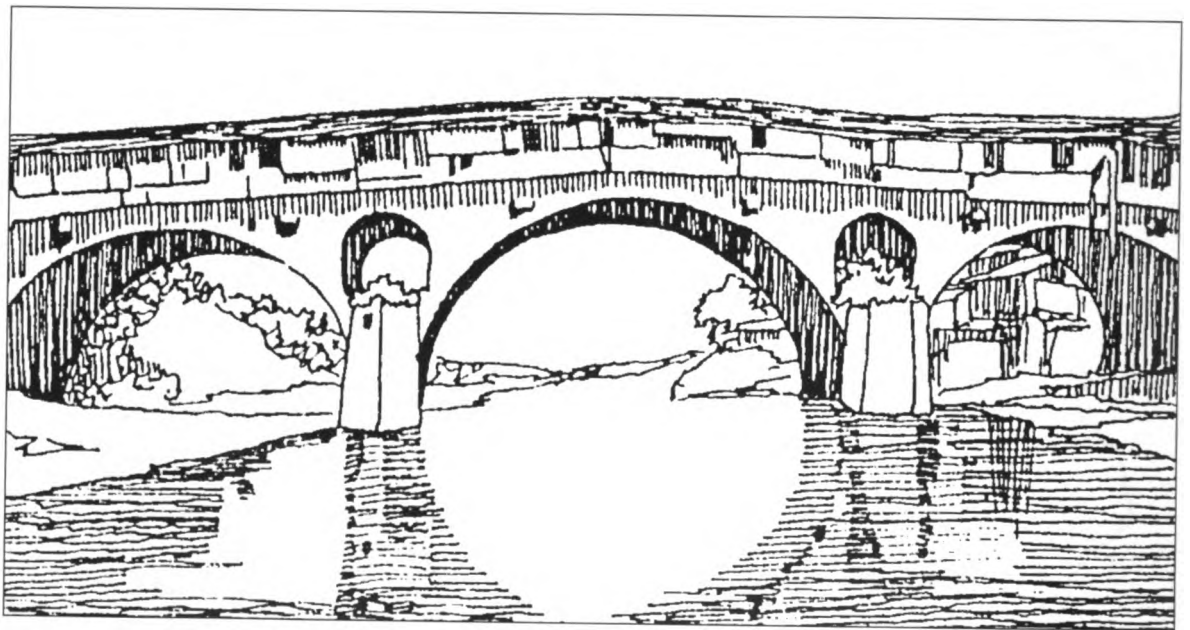


Figure 3.
Shaoxiqiao, at Yuyao.

Figure 4.
The Dulin bridge.
Photo taken in July
2000. Hutuo river is
dry during this time of
the year.



Figure 5.
The mask of *baxia*
above a big arch.
Dulin Bridge.



Figure 6.
Stone slab on the Shan
Family Bridge. On the
left, Yan Hui cooking
rice for Confucius.
On the right, Three
Confucian worthies.
Note the monkey with
severed head on the
right pillar.



Figure 7.
Statues of monkeys on
balustrade pillars. The
stone slab is carved
with flowers. Dulin
Bridge.





Figure 8.
The western balustrade and the decking, with old paving blocks. Shan Family Bridge.



Figure 9.
A stone slab with a running *qilin*. Shan Family Bridge.



Figure 10.
A mask of *baxia* above one
of the small arches of Shan
qiao. Note the metal clamps
on both sides of the mask.
The same devices were used
at Anjiqiao.



Figure 11.
The remains of the lion-rider,
southern bank. Shan Family
Bridge.



Figure 12.

Stone blocks forming one of the big arches of the Shan Family Bridge, with a mask of *baxia* above. Note the metal clamps on both sides of the mask, the same device as used at Anjiqiao.



Figure 13.

Stone slab carved with the story of a scholar's dream. Dulin Bridge.

Figure 14.
A close view of the small arch, with a carved dog
on the top. Dulin Bridge.



Figure 15.
Shan Family Bridge. Photo taken in August 2001.



Figure 16.
The outer side of the Dulin Bridge. Note the
carvings on the balustrade.



Figure 17. Stone slab carved with horses. Note the pagoda on the right pillar. Dulin Bridge.

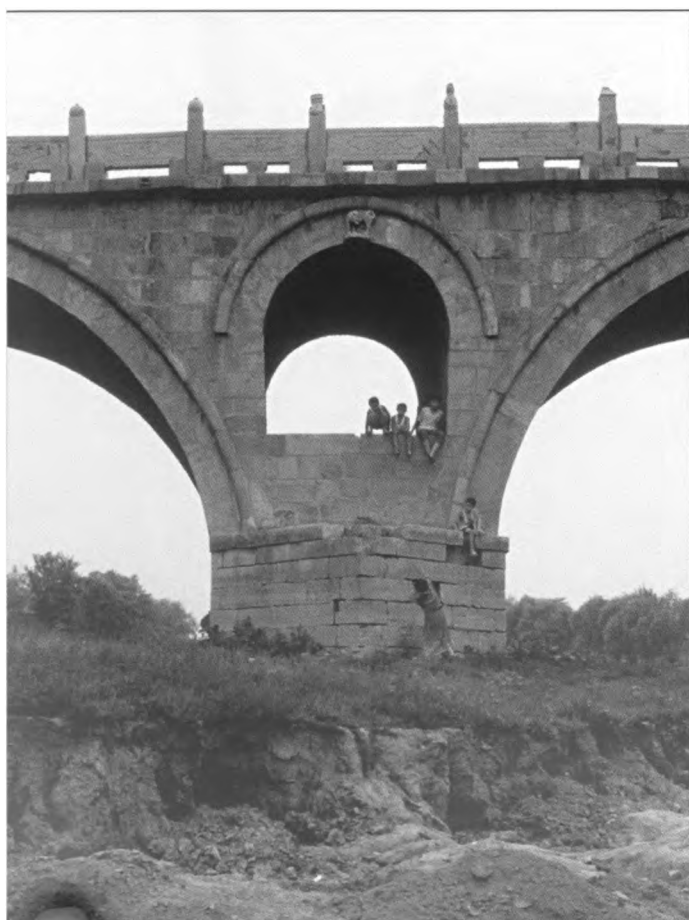


Figure 18.
Stone slab carved with phoenixes, and side pillars topped with lions. Dulin Bridge.

Figure 19.
A close view of one of the piers of the Dulin bridge, penetrated with a small arch.

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